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In the address of President Dow there are a number of important recommendations which should receive the careful attention of the association after the rush and hurry of the convention are over. The first relates to the more complete and automatic co-operation of the M. C. B. association with the American Railway Association—and measures are now being taken in the inner workings of each association to bring this about in a formal manner. Several other recommendations in the address relate to desirable standards, which are of such large importance that, although the railroads would be greatly benefited by their adoption, it has been difficult thus far to obtain a general agreement for recommendations. These are a standard M. C. B. coupler with one type of knuckle, a standard box car, and standard steel shapes for car construction. The adoption of standards for the principal dimensions of a box car would simplify the work of deciding upon standard steel shapes, and these two subjects could be taken up together by the same committee. The history of the association shows, by numerous instances, that the continued agitation of a subject, and work, by one committee after another on desirable standards, finally results in successful achievement. This applies particularly to the standards recommended by the president.

Manufacturers take advantage of periods of slack trade to put their plants in condition to handle the large business that will come when business revives. At present mills and furnaces, after having been operated for years to their capacity, are being relined, refitted and enlarged in anticipation of the return of prosperity. Meantime, the plants of many railroads are being allowed to deteriorate. Maintenance forces have been reduced. Many shops are entirely closed, and few are being repaired and refitted on the scale that is needed to prepare them to meet the demands that will be made on them in a short time. Thousands of cars and locomotives that saw extremely hard service during the years of traffic congestion have been standing on side tracks ever since they went out of service instead of being shopped and thoroughly renovated and repaired; and good parts have been taken from cars that are out of service to be substituted for worn out parts of cars that are in service. The result, it is to be feared, will be that when prosperity returns manufacturers will tender the roads more traffic than ever before and the roads will be ill-prepared to handle it. It is easy for those who disregard differences of conditions to laud the far-seeing course of the manufacturers and to criticise the "parsimonious" policy of the railroads; but, while the laudation is deserved, the criticism is unjust. The course taken by the railroads is a direct and natural result of the methods of regulation that have been employed by the state and national governments. The average profit of the manufacturers of the United States was almost 20 per cent in 1900 and 15 per cent in 1905. In many cases it was much larger than either of these figures. Earning such big profits, industrial corporations have been able to pay large dividends and to accumulate the means with which to renovate and enlarge their plants in hard times at the low wages and reduced prices of materials prevailing in such times. The average annual profits of the railroads of the country in the recent period of prosperity, on the other hand, never reached 4½ per cent. A large majority of them were not able to meet their fixed charges, pay anything like decent dividends and accumulate means with which to put their plants in good shape when the strain caused by the unprecedented increase of their business was temporarily relieved. They have found themselves in a situation analagous to that of the Arkansas man in the old story who could not repair the roof of his house when it was raining and did not see the need of repairing it when it was not raining; the roads could not make all needed repairs and improvements when business was heavy, and have not the revenues out of which to make them when business is slack. When the public learns that adequate facilities of transportation are more important than low rates, and that adequate facilities can be secured only by letting railroads earn as high profits as are earned by other large business concerns, there will cease to be heard complaints that the carriers do not, like other big concerns, get their plants ready in hard times to handle the heavy business of good times.

CAST IRON WHEELS.

The struggle between the railroads and the manufacturers over the quality and price of rails is being repeated in the case of the chilled iron car wheels, and while the wheel question has not yet become so acute as to demand the serious attention of the higher railroad officials it will probably reach that stage before a satisfactory agreement is reached. The conditions with respect to the wheel are different from those affecting the rail by reason of the general interchange of cars, and while some lines may manufacture the best wheel possible, regardless of its cost, and others may buy poor wheels at a cheap price, all roads are liable to suffer from accident due to the failure of the poor wheel. This point is recognized in the M. C. B. report on cast iron wheels and the committee now regards it desirable to secure such regulation of foundry practice as will tend to secure uniformity in the product of different foundries. This would include uniform chemical characteristics as well as physical properties, to be obtained by the use of standard mixtures of pig iron and scrap, and ladle analysis of the molten metal.

To secure safe wheels is not entirely a matter of specifications and inspection, but it is also necessary to pay a fair price, based on the cost of good materials. The 700-pound wheel is now purchased for $3.50 and addition to an equal

weight of old wheels, and the new wheel is guaranteed for four years' service against maker's defects. This is a charge of less than $1.00 per wheel per annum, which must be regarded as a low price for a wheel suitable for high capacity cars.

The report of the wheel committee presented in 1907 recommended that a service record of the performance of the new pattern wheel be maintained by members of the association for a sufficient period to determine what service could be fairly expected from them under the increased wheel load so that definite data would be obtained for a guarantee in wheel contracts. Some of the leading railroads now have this information and it is proposed that the association instruct the committee to prepare a standard guarantee for the service of cast iron wheels.

It is safe to say that the records referred to have revealed such a reduction in the average mileage of wheels from high capacity cars that there will be more disposition to make some concessions in the matter of price than there has been heretofore, and it is possible that wheel contracts will have some reference to the capacity of cars in which wheels are used. The increasing proportion of wheels removed from 50-ton coal cars, before they have rendered the ordinary time service under former guarantees, has been the cause of constant struggle between the purchasing agent and the wheelmaker, and it is claimed by some manufacturers that by reason of this small mileage and frequent renewals the cost of inspecting and testing, keeping the guarantee records and of putting in and removing wheels from service, the wrecks and accidents due to wheel failures, far exceeds the net cost of new wheels purchased.

Before such conditions are remedied and a satisfactory agreement is reached the severe service imposed on cast wheels by high capacity cars must be recognized by the railroads and they should manifest some disposition to pay a sufficient price for the heavy wheel so as to enable the manufacturer to use the best materials and the best foundry practice with some profit in his business.

AUTOMATIC CONNECTORS.

While the lapping type of automatic connector has worked successfully for several years on the whole of the passenger equipment of the Long Island Railroad, including 700 cars, yet the Master Car Builders' committee on this subject has evidently found that there are some defects in it which compel it to recommend the butting type for the standard. The subject has been under consideration several years and sufficient experience has been had with each type to warrant the association in definitely deciding on a standard type during the coming year. It was found that the damage to gaskets by the lapping type was too great to recommend it and the difficulties in the way of overcoming this seemed too serious, and largely for this reason the butting type is preferred. An agreement can also be reached that three ports, a central one for air, a top one for signals and a bottom one for steam heat, will be sufficient for passenger requirements. The separate support and guides for a triple port coupler, in all the designs thus far provided, appear to be so elaborate, complicated and awkward, if we may use the term, that railroad managers will hesitate to use them except under special conditions, such as in suburban or electric service, unless compelled to do so by law.

For freight purposes the only requirement for the connector is that it provides for the air hose coupler and makes this automatic; there is strong hope that this may be accomplished in the coupler itself without extra guides and supports. The use of anything equivalent to the under-hung construction, as used for automatic passenger connectors, is absolutely prohibitive for freight service, not only on account of its first cost but by reason of its liability to derangement by rough switching service and the enormous cost of repairs which must inevitably follow.

If the air pipe connector is to be in the car coupler, then a new coupler head must be designed and the present standard hinged knuckle abandoned. It would be possible to design an automatic car coupler which would be sufficiently flexible to adjust itself to the numerous and frequent motions of the end sill and maintain a tight connection of air ports made integral with it; in fact such a coupler has been designed. But having completed the equipment with automatic car couplers on more than two and a quarter millions of cars, it hardly seems possible that the railroads of the United States should now be compelled to do the work over again at a still greater expense, by providing car couplers which will act as air connectors also.

The other alternative is to make the present coupler act as guide and support of the underhung air pipe connector. While this would save the expense for new car couplers, it is evident that a device which will maintain a tight gasket when subjected to the motion and blows which car couplers endure must be substantial and require a more expensive machine finish than is given to the coupler itself. It will thus be comparatively expensive in first cost and maintenance, but this is probably the line upon which the problem will finally be worked out. One thing should be kept in view in this development and that is the entire elimination of the rubber hose, and the present large expense for hose would then be a credit to offset the cost of maintaining the new connector.

The question arises, Are conditions of freight service such as to warrant the expense of either form of coupler or connector? It is true the automatic car coupler is used to avoid the danger to men going between the cars to couple or uncouple the cars, but they still have to go in to couple the air brake hose and this takes time and is sometimes dangerous. But the danger is not nearly so great in coupling hose because it is not necessary to go between the cars until they are at rest, and much of the injury to trainmen in making such couplings must be due to their own carelessness. The railroads may, therefore, be justified in resisting as far as possible the attempt to compel them by law to equip freight cars with automatic air pipe connectors.

The probable course of the development of the automatic connector will be the improvement of the 3-port connector of the butting type and its gradual introduction on passenger equipment. The larger experience with this will assist in the proper design of the single-port connector for connection to the present freight car coupler, but it is likely that experimentation with such a fixture must extend through the next five years or longer before a satisfactory one is obtained and the Master Car Builders' Association warranted in adopting it as a standard.

One of the features of the reception at the Marlborough-Blenheim on Wednesday night was the music of the mandolin and guitar orchestra on the plaza. Unfortunately, many of the guests did not know of its presence and failed to hear it.

Among the faces conspicuously missing from this year's conventions is that of Charles W. Martin, Jr. It is doubtful if any man at the June conventions during the last ten years was better known or more generally liked than "Charlie" Martin. He had a genial and likeable personality and was always to be depended upon for committee work—and hard work at that; he was chairman of the entertainment committee for one or two years, and he was chairman of the supply men's association for the convention held at Manhattan Beach in 1905. Mr. Martin died of pneumonia in December last, and his family and his associates in the concern of Jenkins Bros. are not alone in mourning his death.

Conventionalities

Donald Molleson is attending the convention with Mrs. and Mr. George E. Molleson.

George H. Musgrave, of the Star Brass Manufacturing Company, is here in spite of a bad sprain.

C. E. Postlethwaite, manager of sales of the Pressed Steel Car Company, Pittsburg, is again with us. He is registered at the Marlborough-Blenheim.

E. M. Marshall, of the Illinois Malleable Iron Company, Chicago, has not yet put in his appearance. Chas. L. Sullivan is guarding the exhibit in booth 564.

Baron Fritz von Hiller of Mexico City, general representative of the Pressed Steel Car Company, is a visitor at the convention, en route to Europe for a 90-day visit.

Frank B. Hart, formerly with the Detroit Steel Casting Company, has resigned and has recently been appointed sales manager of the Ohio Steel Foundry Company, Lima, O.

Beale's orchestra, eight pieces, has been engaged to play in the entrance hall of the pier at 11 a. m. and 3.30 p. m. in place of the band during the remaining days of the conventions.

Visitors are requested to apply at the office of James S. Murphy, City Agent, Pennsylvania Railroad, 1224 Atlantic Avenue, for Pullman space and tickets when ready to return home.

A. Munch, all the way from Minneapolis, representing the Washburn Steel Castings and Coupler Company of that city, arrived Wednesday. The Washburn company will not make an exhibit this year.

Prof. Edward C. Schmidt, of the college of engineering, University of Illinois, requests that graduates and former students of the university in attendance at the convention leave their cards for him at the office of the Daily Railroad Age Gazette.

The concert by the Victor Herbert orchestra of 50 pieces in the Entrance Hall at 9 p.m., Friday night, will be personally conducted by Mr. Herbert, and no music except Mr. Herbert's own will be played. Mrs. Mary Jordan Fitzgibbon will be the soloist.

Hon. John B. Corliss, of Detroit, Mich., who has been a representative in Congress from Michigan for six years in addition to being president of the Michigan Lubricator Company, will be in attendance at the Master Mechanics' convention. He will be accompanied by his daughter.

The singing of Mrs. Mary Jordan FitzGibbon was one of the most enjoyed features of the reception at the Marlborough-Blenheim on Wednesday evening. Mrs. FitzGibbon has a beautiful contralto voice and her numerous friends among the visitors to the conventions are always delighted to hear her.

The all-steel passenger coach exhibited by the Pressed Steel Car Company which was mentioned in our issue of June 18 in the addition to list of exhibits as being at the Philadelphia & Reading depot, is a part of the track exhibit at the electric station adjoining the Pennsylvania passenger station.

It was announced in the convention Wednesday that the Pennsylvania Railroad and the Pennsylvania Lines West will furnish free return transportation to railroad members of either association. Names of those desiring to avail themselves of this offer should be handed to J. W. Taylor, secretary.

The booth of the Standard Coupler Company has been nicknamed the "smile" booth because it has nothing but smiles on exhibition. This is not strictly true, however, because a very excellent brand of cigars is being handed out to the men visitors and the ladies are being supplied with "bloomers", otherwise flowers.

In the description of the steel mail and baggage cars for the St. Louis & San Francisco appearing in our issue of June 18, page 133, the sheathing and lining was erroniously stated to be National steel sheathing. This material is that known as "Metallic (Steel) Sheathing" and was furnished by the General Railway Supply Company, Chicago.

The baseball suits for the railroad men's team have arrived, and will be ready in a room at the Marlborough-Blenheim on Saturday morning at 11 o'clock, and the players can call and get their suits between 11 a.m. and 1 p.m. Those who care to can also dress there. The number of the room can be ascertained at the clerk's desk.

William St. John of the Safety Car Heating & Lighting Company, spent a greater part of Thursday acknowledging congratulations of friends because of his sixty-eighth birthday. Some of his associates got together and presented him with a pair of handsome cuff buttons. Incidently, this is Mr. St. John's twenty-eighth year of attendance at these conventions.

Maj. H. C. Howell, formerly for many years in the railway supply business and a regular attendant at conventions, is at Atlantic City this year as manager of the railroad department of the Fidelity & Casualty Company. The major reports a strong undercurrent tending toward prosperity and that he finds evidences of it among all classes of railway officials and employees.

The many Western friends of Mr. and Mrs. F. O. Brazier will regret to learn of the permanent removal of these young people from Chicago to the East. Mr. Brazier, after six years of work in the Southwest in the interests of the Murphy Varnish Company, has been complimented by President Murphy in the form of a special position in the railroad department of the Murphy company in the East.

George B. Maltby, general railway supplies, American Trust building, Cleveland, Ohio, with his wide acquaintance among railroad officers, is preparing an active business campaign. He represents the Ohio Metallic Packing Company, the McInnes Steel Company and the Thompson Mfg. Company, all manufacturers of high class specialties for railroads, and will take on one or two more good accounts.

The Safety Car Heating & Lighting Company's proximity to the whale tank has suggested a novel contest which will take place each day at 4:30. This will be a net haul in miniature. A section of the tank has been stocked with mechanical fish, the sectionalization being made in order to avoid a repetition of the story of Jonah. Ladies are supplied with landing nets and the choice fish are designated by numbers. Those who are so fortunate as to make a lucky haul will receive prizes. D. W. Pye, vice-president, is in charge, and the fishing takes place from the Safety Car Heating & Lighting Company's "pier."

The following ladies have been selected as score card girls for the baseball game Saturday: Mrs. R. W. Burnett, Mrs George W. Wildin, Mrs. C. B. Young, Mrs. F. O. Brazier, Mrs. O. M. Deems, Mrs. A. L. Whipple, Mrs. J. M. Stayman, Mrs. Frank Morrison, Mrs. S. W. Midgley, Mrs. Charles P. Storrs, Miss Dow, Miss Ethel McIntosh, Miss Garstang, Miss Pratt, Miss Moran, Miss Brazier, Miss Walsh and Miss Fowler.

George Stanton, of the Cleveland Frog & Crossing Company, who also rejoices in the title of president of the Road & Track Supply Association, and who, even when he is not presi-

dent, rejoices anyway, has put in an appearance at Atlantic City. George did not bring along any of his frogs. Batrachians, being fresh water animals and, moreover, cold-blooded, would be out of place on the beach and among the products of the net-hauls.

In describing the net hauls in yesterday's daily we omitted to include one that is a whole show in itself. The net is not as large as those recognized officially by the two piers; neither is the variety of inhabitants of the briny deep as great nor are they so numerous; but the demonstration itself is well worth witnessing. We refer all inquirers to the exhibit of the Standard Paint Company. The hauls take place every hour, at four minutes 30 seconds after the hour.

The parade for the ball game will form on the piazza of the Marlborough at 2. p.m. on Saturday, and headed by the band and the two contesting teams will march to the junction of the Boardwalk and South Carolina avenue where special trolley cars will be in readiness to take the company to Inlet Park. After the game the cars will return the crowd to the same point. The cars leave South Carolina avenue and the Boardwalk at 2:30. Game will be called at 3 p.m.

The many friends of Mr. A. G. Hollingshead, member of the Executive Committee of the Railway Supply Manufacturers' Association, will regret that that popular supply-man has resigned from the committee. Mr. Hollingshead, having decided to establish business head-quarters in Chicago, concluded that he could not properly represent a district in which he did not live, hence his resignation. His colleagues on the committee will miss his valuable co-operation in its important dliberations.

H. H. Robertson, treasurer of the Asbestos Protected Metal Company, Canton, Mass., accompanied by Mrs. Robertson, is at the Traymore. Mr. and Mrs. Robertson are not only attending their first M. C. B. convention, but this is their first visit to Atlantic City. Robert J. Mollan, middle western representative of the company, and J. T. Crawford, Philadelphia representatives, are stopping at Chalfonte. The company's exhibit booth is No. 565 in Marine Hall. Visitors are welcome.

A cursory inspection of the first official list of members and guests in attendance and a comparison of notes with members of the enrollment committee by whom the list is issued indicates that the registration to date is substantially the same as last year at the same period, with a slight advantage in favor of the present year, which may be due to the fact that the committee began its work earlier in the week. The list itself is a highly creditable piece of work and reflects the activity, careful attention and business capacity of members of the committee.

Further information relative to the arrangements for the ball game on Saturday only confirm previous predictions as to the magnitude and splendor of the event. As previously indicated, the procession will be headed by Beale's band. Following the band will come the two teams under the lead of Captains Wildin and Midgley; then 16 score girls in fancy costumes, whose ultimate destination is the score benches; and the official division of the procession will be followed by Senor Marco Younglove's Famous Mexican Band of 21 pieces and some fragments.

A most artistic and ingenious electrical sign has been installed upon the east side of the Entrance Hall of the pier, designed to call the attention of promenaders on the Boardwalk to the exhibit of the American Blower Company, Detroit. The sign is an operative one, and outlines in incandescent lamps the blower and the mysteriously supported ball which numerous exhibits of the company have made famous. The electrically-outlined ball, being eccentrically mounted, wabbles and rotates in close imitation of its original, and even the breezes which are supposed to support it and maintain its motion flicker through space in a startlingly realistic way.

It is reported that at such times as his presence is not required in the convention, George W. Wildin, captain and manager of the Railroad Men's Baseball Nine, is engaged in putting the fine points on his training for Saturday's game. The report further states, though his movements have been covered by his trainer with the greatest secrecy, that he has chartered an empty box car as training quarters, and that for some hours daily he has been putting himself through a series of evolutions, the result of which cannot fail to form a marked feature of Saturday's game.

Cornell S. Hawley, chairman of the vaudeville committee (a subcommittee of the entertainment committee), who has attended the conventions for some years past, is representing th Consolidated Car Heating Company this year in a new capacity. He was elected vice-president and general manager at the annual meeting of the company on June 9. While his headquarters will be in Albany, he has arranged to spend one day each week at the New York office. Mr. Hawley has been connected with the Consolidated Car Heating Company for the last nine years, the last four as general sales agent.

Daniel M. Brady, president of the Brady Brass Company, New York, has a couple of souvenirs in his pockets this year which appeal especially to the sensibilities of the newspaper man. Dan's pencils have been the prime mover in getting into print divers and sundry notes of more or less permanent interest and value; but when he accompanies each box of pencils with a pipe to assist in developing the inspiration that must precede the pencil's work, he leaves nothing to be desired. So far as the writer is concerned these tokens appeal to him more strongly than much brass; yea, than much "Cyprus Bronze."

Representatives of the Chicago Pneumatic Tool Company have just received sad news involving one of their associates. Henry J. Kimman, manager of the Cleveland plant of the company while driving his automobile with his sister and brother, and by reason of some chance not yet explained, as he was known as an unusually careful driver, ran into a street car. All were thrown out and seriously and perhaps fatally injured. The first news received was that the accident was fatal to Mr. Kimman but at last accounts he was still living, though in a precarious condition.

George R. Rayner, secretary of the Carborundum Company, Niagara Falls, N. Y., is scheduled to arrive at Atlantic City on Saturday morning. There is good authority for the statement that as shortstop in the game of base ball he is more "peerless" than Wilyum J. Bryan is in his favorite position. Rayner modestly says that the side that gets him gets the pennant. Owing to the geographical location of Niagara Falls, he is eligible for either eastern or western team, if the game were to be played that way this year, and though somewhat inclined in his business to favor a "grinding" monopoly, he distributes his ball-playing capacity impartially.

Harry D. Vought, who is in attendance upon the conventions as the representative of the New York Commercial, in the course of a casual conversation disclosed a remarkable record as a newspaper man. Though very far from looking the part, he has been in newspaper work for 40 years and what is more remarkable still, considering the transitory nature of newspapers and the flitting tendencies of newspaper men, this 40 years of service has been confined to three papers. Since 1883 his work has been exclusively railroad work and he is one of the three or four railroad journalists of the country having the highest record in point of duration of service. Mr. Vought began his career with the railway mechanical conventions when the late M. N. Forney was

secretary, and though there have been some gaps in continuity this is the fifteenth convention which he has attended. In addition to his active service as a newspaper man Harry has found it possible to spread himself out so as to cover the secretaryship of two railroad clubs, he having been secretary of the Central Railway Club at Buffalo for 14 years and he is now serving his fourth term as secretary of the New York Railroad Club.

"Compensation and Its Law" is the subject of a paper that will be presented on Saturday evening at the annual dinner and reunion of the Society of Railway Club Secretaries by B. W. Frauenthal of the St. Louis Railway Club. The author has given the subject careful and thoughtful attention and his handling of it promises to be of much interest. Members of the society are very desirous of the presence on this occasion of the officers at least of all clubs, who may be in attendance upon the conventions. Others who may wish to do so will be welcome. The dinner list will be closed tonight. Tickets may be obtained from the secretary, Harry D. Vought, and Daniel M. Brady, who can be found at the Hotel Brighton, or J. D. Conway at the registry booth on the convention pier.

The committee includes the following: Mrs. Dow, Miss. Dow, Mrs. McIntosh, Miss McIntosh, Miss Ethel McIntosh, Mrs. Fowler, Miss Fowler, Mrs. Deems, Mrs. O. M. Deems, Mrs. Hopkins, Mrs. Pearsall, Mrs. J. F. Walsh, Mrs. Pratt, Miss Pratt, Mrs. Noble, Mrs. Marshall, Mrs. Moran, Mrs. Brazier, Mrs. F. O. Brazier, Mrs. Whipple, Mrs. Ross, Mrs. Walbank, Mrs. Charles P. Storrs, Mrs. Midgley, Mrs. Wildin, Mrs. Molleson, Mrs. F. H. Clark, Mrs. Stayman, Mrs. W. H. Miner, Mrs. La Bonta, Mrs. Dunkelberg, Mrs. Garstang, Miss Garstang, Miss Moran, Mrs. Weatherley, Mrs. Ramsdell, Mrs. Howard, Mrs. Rhodes, Mrs. Burnett, Miss McKenna, Mrs. C. E. Fuller, Mrs. Chambers, Mrs. Courtney, Mrs. Blanchard, Mrs. George Moses, Mrs. Mitchell and Mrs. Meek.

A visitor at the conventions who had seen all the larger international expositions of the past twenty years said yesterday: "There was nothing even at the World's Columbian Exposition at Chicago, at the Paris Exposition or at the Louisiana Purchase Exposition at St. Louis, which in uniformity and completeness of arrangement equalled the exhibits here. The effect produced by having the booths, the signs, etc., similar is very pleasing. There is an air of simplicity and compactness, too, that makes a very agreeable impression on the eye. The completeness of appearance of all the booths on the opening day of the Master Car Builders' Convention was something remarkable in view of the apparent conditions that existed on Tuesday. On Tuesday confusion and pandemonium seemed to reign in many booths in which on Wednesday everything was in place, from the matting on the floor to the signs on the walls; heavy machinery that had not arrived on Tuesday was in place on Wednesday and being operated just as if it had been set up in some place where it was to be used permanently. There have been bigger exhibits and more of them at the great expositions, but there have never been any that in many respects were superior."

Master Car Builders' Ball.

The forty-second annual ball of the Master Car Builders' Association was given at Entrance Hall on Young's Million Dollar Pier on Wednesday night. The grand march was led by the officers and members of the executive committee of the Master Car Builders' Association and their wives. Supper was served by the Shelburne Hotel management in the balcony. The music was by Beale's orchestra of 30 pieces from Philadelphia. The arrangements for the ball were made by a subcommittee of the entertainment committee of the Railway Supply Manufacturers' Association, composed of E. H. Walker, chairman; Bertram Berry, Cornell S. Hawley, F. O. Brazier, T. C. Rosset and R. S. Chisolm. Charles P. Storrs, general chairman of the entertainment committee, was active, as usual, in the work of making the ball a success. The programme cover had upon it a half tone engraving of some new passenger coaches designed by G. N. Dow, president of the Master Car Builders' Association. In the place where the name of the railroad usually appears were the words "Atlantic City, 1908," and in the place where the name of the Pullman Company usually appears was printed Mr. Dow's name. The occasion was one of the most enjoyable of the kind in the history of the Master Car Builders' Association. The attendance was large, and seldom, if ever, have there been seen upon the floor more beautifully gowned ladies. The music was by Beale's band and orchestra of Philadelphia.

A Railroad and Supply Association Brass Band.

One of the strongest and most popular features of the annual entertainment for these associations has been the baseball game. In years past the association has had to depend entirely upon the professional band for this special entertainment. It has been discovered that there are not only expert baseball players within these associations, but they contain also a very large number of expert musicians. Therefore, the thought has occurred to several of these gentlemen that it is not only possible but quite probable that a band might be organized among the members that could add a very great deal to the day by furnishing the music for this, one of the most interesting events of these conventions. The Daily Railroad Age Gazette has been requested to ask all members of the M. C. B. and M. M. and Railway Supply Men's Associations who have in the recent years past, or do now play a wind instrument in any musical organization and would be willing to join an association of this character for the purpose above stated, to hand in their name in an envelope, addressed "Band," to the Daily Railroad Age Gazette at the earliest possible moment in order that a meeting may be called to perfect an organization.

The District Meetings.

The following letter is self-explanatory:

The Railway Supply Manufacturers' Association,
241 Railway Exchange Building.
Office of President.

June 18, 1908.

Railroad Age Gazette,
Million Dollar Pier,
Atlantic City, N. J.

Gentlemen:—The District meetings for the election of members of the executive committee of the Railway Supply Manufacturers' Association to fill vacancies will be held in the Greek Temple on the Million Dollar Pier, Friday, June 19, as follows:

Third District (Supply men residing in Pennsylvania, Maryland, Delaware, District of Columbia, West Virginia—two members in place of Geo. N. Riley and Frank L. DeArmond) 3:00 p.m.

Fourth District (Supply men residing in Ohio, Indiana, Michigan, Kentucky and Tennessee—one member in place of A. G. Hollingshead). 3:30 p.m.

Fifth District (Supply men residing in Illinois, Wisconsin, Iowa and Minnesota—one member in place of R. T. Walbank). 4:00 p.m.

Sixth District (Supply men residing in Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama and Mississippi—one member in place of L. O. Cameron). 4:30 p.m.

Very truly yours,
Railway Supply Manufacturers' Association,
By Earl G. Smith,
Secretary.

MASTER CAR BUILDERS' ASSOCIATION.

Proceedings of the Second Session of the Forty-second Annual Convention.

President Dow called the meeting to order at 9 o'clock and the convention proceeded to the discussion of the report of the committee on "Tests of M. C. B. Couplers" (see page 143).

T. H. Curtis (L. & N.): There have been some slight changes made in the diagram (see Railroad Age Gazette, page 145) since the report was published. The report shows the bracket for the uncoupling lever to be slotted. This bracket is patented, and the patent expires in July of this year. The cut also shows the bracket having been secured by bolts and the bolts are then centered with the bracket. This is also patented. The report shows the holes on the bracket slotted and this is also patented. The committee has prepared a blue print showing the bracket located in the center of the holes, which avoids one of the patents, and the holes are made round in place of slotted, which avoids the other patent.

I wish to especially emphasize the necessity of close inspection to the attachment of the yoke to the butt of the coupler. It has been recommended by several that we make a change in this standard. The ordinary work done at shops when the men have not been instructed to do special work is not above the average, but I feel sure that the attachment of the yoke to the butt of the coupler can be very much improved by some personal work among the blacksmiths and those who rivet the yokes to the butts, to tell them that the rivets must fill the holes and that the lugs must fit tight together. On our own road I was much surprised to find our blacksmiths did not understand the necessity of the rivets filling the holes, and after it was explained we had much better work.

J. E. Muhlfeld (B. & O.): Referring to the "Attachment of Yoke to Butt" and the improvement to be made in the application of the yokes to the coupler butt, of which Mr. Curtis spoke, the Baltimore & Ohio has been following this practice for three or four years and has not found it necessary, in making use of the reinforcement lug to produce a pocket, to do any machining. We have found that the brackets assist very materially in securing a good fit of the yoke gibs against the coupler butt, and in relieving the shearing stress on the rivets. When we first put the lug on it was a little too low, and we found that the blacksmiths would chip off the lug instead of trying to fit the yoke to the coupler shank. We increased the height and the width, so it is more of a job now to chip off the lug than it is to get a proper fit. We have found with long and short coupler yokes that the clamping of the gib in the pocket has relieved the rivets of a great amount of shear. While we agree than an increase in the size of the yoke rivets from 1⅛ to 1¼ inches is desirable, we also believe that further consideration should be given to the use of the abutting lugs. Our experience, which applies to a great many couplers, is that it is not necessary to do any machining in order to make a proper fit. We consider that in forming the gibs to the two limbs of the coupler yokes the practice of bending instead of upsetting the metal should be followed out. From tests that we have made we find that gibs that are upset on the ends of coupler yokes, as well as on truck arch bars and other similar parts, frequently failed, whereas those which are formed or bent have much greater strength.

With respect to paragraph six of the summary of the recommendations for standard or recommended practice, we regret that the committee has not incorporated in this report a recommendation to cover the revision of the guard arm test. As stated in the report, the failures of cast steel couplers through the face wall in front of the knuckle lock cavity, as well as at the junction of the guard arm to the body, all of which appear to be due to the guard arm blow which has been aggravated by the increased and necessary side clearance of couplers at the end sill of striking plate, are items of considerable consequence. From investigations that we have made for the purpose of overcoming these failures, it has been found that the quality of the metal, as well as the cross sectional area, enters largely into the matter, and we are of the opinion that minimum and maximum limits in the chemistry is desirable and in fact necessary in addition to the proposed change in design in order to insure the proper reinforcement without the liability for distortion, such as would result in destroying the contour line of the face of the coupler head and guard arm to such an extent as to permit of uncoupling. I think of the two methods the preferable one is to break the coupler through the face wall or guard arm rather than to have a low carbon steel which will permit of the distortion of the guard arm and result in uncoupling on the line. The chemistry of the material is a strong factor in producing a guard arm that will keep the contour and at the same time when it does become distorted will fail, so that it will be discovered and taken out of service. An examination of the couplers that have failed in a great many cases have shown that they were unannealed.

I move that the standing committee on "Tests of M. C. B. Couplers" be requested to submit recommendations to cover a material specification for coupler head castings which will incorporate the chemistry or at least the maximum allowable limit of certain elements in addition to the minimum allowable cross sectional area of metal between the face and the knuckle lock cavity, and at the junction of the guard arm to the body of the coupler head in the essential locations.

R. L. Kleine (P. R. R.): The present guard arm test now has incorporated in it a spread of the guard arm. As the spread of the guard arm is taken care of by certain dimensions, it is a question whether we want the chemical analysis and whether we should not leave the matter to the best judgment of the coupler manufacturers.

Mr. Muhlfeld: The proposed guard arm test which is a spreading test, I think more nearly meets the actual conditions of service. The present guard arm test does not represent the conditions you get in service. where a car is really dealt with, especially on curves, and with the increased lateral strain that we have at the present time and which is ncessary, I think that the proposed test will bring out not only the spreading action of the guard arm but will approximate more nearly the actual service conditions. We have found that where a low carbon steel is used the coupler distorts before it fails and the result is the coupler is kept in service and there is trouble from trains parting. If the proper chemistry is applied the maximum rigidity of the guard arm can be maintained and at the same time provision made for a failure when there is a certain amount of distortion such as would cause the cars to part on a line of road.

Mr. Kleine: I would like to ask the members whether they consider a chemical analysis of the material that goes into the coupler necessary to ascertain the allowable amount of distortion.

W. E. Fowler (Can. Pac.): I hope chemical analyses will not enter into our specifications. We ask the coupler manufacturers to give us a coupler which will give us the required service. We tell them regarding the service we want, and acquaint them with the failures which are becoming more prevalent, and it is to their interest as well as ours to see that the proper chemical constituents enter into the steel of which they make the couplers.

F. H. Clark (C. B. & Q.): I agree with Mr. Fowler. I think if we specify the physical tests required, and the dimensions required, that we will do well to leave the chemistry to the manufacturers. I do not think we can specify so many things—particularly the chemical analysis—and expect the manufacturer to take the interest he otherwise would in the improvement of his product.

R. C. P. Sanderson (Virginian): The committee makes a brief reference to the side and bottom operating levers for couplers. I presume it did not go into that further, because so many of the couplers are patented, but my judgment is, after looking into the matter a good deal, that we will have to come to a side operating device sooner or later, and that it can be safely used if the operating parts are properly shielded or guarded by a projection on the coupler head, and that it should be on the knuckle pin side of the coupler head, and not on the guard arm side of the coupler head, as it is less subject to damage on the knuckle pin side.

The standing committee, as I remember it, was instructed to gradually modify the contour lines at intervals, so as to work to what was then believed to be the proper line. The coupler manufacturers have not conformed properly to the changes. That brings out the importance of using the coupler gages in purchasing both couplers and knuckles, but I would like to ask the committee if the time is not ripe for still further progress toward the final lines.

In regard to the suggestion made by the committee that the distance from the face of the guard arm to the face of the couplers should be increased ½ inch, I think that is objectionable, because I am very confident that we will go back in a short time to the use of dead blocks. This has to come with the steel cars. Adding the extra ½-inch length to the head will complicate the difficulties with reference to the proper length of the dead block. There are a great many roads that use the dead block and believe in it, and there are a good many thousands of cars equipped with the dead block.

The Virginian road has the problem before it of handling 80 loaded coal cars, of 50 tons capacity each, in one train. I had not believed until recently, that for moderate service friction draft gears were essential; they might be beneficial but not absolutely essential.

I found it rather hard to come to any definite conclusion

until the opportunity was given me of making tests, which were briefly referred to in the paper I read before the New York Railroad Club by using a 9,000-pound drop test. We found that the draft gears did not perform under concussion shocks in a manner that would be proportionately represented by their apparent performance on a static machine, as shown by the diagram on such a machine.

After making the first series of tests, The Railway Age criticized the results, and I was not satisfied with the results in that they left questions of argument open. It was then arranged with a manufacturing concern which had put up the drop test, and turned over the use of it to me, to put in a liquid dynamometer under the anvil carrying the draft gears, with a pipe connection to an indicator of the same kind as used by the United States government in reading the powder pressures in the breeches of big guns.

We got diagrammatic records of the shocks transmitted to the anvil, which in this case represents the underframing of the car, by various gears and combinations of springs and gears, etc. The test was very instructive. The height of the drop was gradually raised until the shocks became so severe that it was hardly safe to go any further without smashing the foundation.

I found there were great differences in the effectiveness of the draft gears and made up my mind that none of us knew very much about friction draft gears.

I would strongly urge that this convention should decide that the committee should take up a heavy drop test of that kind, equip it in the manner mentioned, or at least something equivalent thereto, which will produce results that are directly comparable with service conditions and develop from such tests as can be made with such an apparatus in the laboratory at Purdue (where it will be removed from all question of the influence of interested parties) a set of specifications of the requirements for friction draft gear to which the manufacturers can work.

After getting through with the friction draft gear tests I wanted to learn something about the dead block, and used a pair of class G springs in the regular casing and an oak block, and I got results which were better than most of the results from the friction draft gear, so far as the effectiveness as a cushion in dissipating the effect of shocks transmitted to the anvil is concerned. That is not saying, and I do not wish to be construed as saying, that that can take the place of a friction draft gear, because it only acts in compression and cannot be very well arranged to act in tension. It is necessary to have the cushion to act both ways to a reasonable extent, but I do contend that it is a very wise thing to use malleable iron or cast steel dead blocks, of proper area, with an oak cushion between them, and a rigid steel frame to take up that portion of the immense shocks transmitted to the steel frame that go entirely beyond the capaciy of any conceivable draft gear to dissipate.

To get a better idea of what that oak block actually would do I put it in a hydraulic static testing machine and got a diagram showing 1 3-16 inches movement on 200,000 pounds pressure, which is as pretty a friction draft gear diagram as you want to see. There is a cushion costing three cents and an effective one, and I claim we are unwise to disregard it; and further I claim that the coupler, especially in view of the fact complained of by certain railroads that the coupler head, as a box of mechanism cannot properly be made in suitable form to stand the punishment it will get in collision shocks beyond reasonable coupling speeds, and that some protection of the frame itself and of the coupler head is needed, and that it is best provided in the shape of the dead blocks with the oak cushion behind. I would not use them without the oak cushion, but I strongly urge the consideration of the use of them with the oak cushion. They have been used before in the old pattern, but in the drop test, of which I spoke, we found a point at which the oak crushed and it was very easy to deduce from that the pressure per square inch that it was wise to depend on in using the dead block and oak cushion, so you can increase the base of the dead block in proportion to that information, and figure out the upper area you should have to withstand any reasonable concussion shock you have to meet. None of us can figure on what a serious inclined shock or a yard runaway is going to be, but let the oak block be broken—it only takes 30 cents to apply it.

With regard to the coupler side clearance, why not try to get at the side clearance that was really necessary to use, without adding the maximum curvature you will have to provide for on the floor of a big warehouse. We found we would have to have 1¾ inches lateral on each side to relieve the wheel flanges of unnecessary strains in curving. That means 3.5 inches total and with 3.5 total clearance it begins to look as if some means were necessary to move the coupler head either backward or forward without going between cars to do it, and I believe the committee ought to take that in consideration for the coming year, and see if some practical method can be devised by which that can be accomplished. We want to keep the men out from between the cars.

Mr. Sanderson exhibited a series of diagrams taken on the apparatus described, and said: Down at the bottom you will find the lines of the two class G springs and the oak block. It is not as good as few of the other gears but it beats a good many of them, and I do not think there is anything that can be more conclusive as to the merits of the oak cushion behind the dead block than a careful study of that information or similar information, obtained, as I have obtained this, by personal work.

J. J. Hennessey (C. M. & St. P.): I am sorry the committee did not give this a little more attention, to side and bottom operating couplers. This style of coupler is used as a standard practically on some roads.

F. W. Brazier (N. Y. C.): I have signed the report of the committee, as a member of the committee, and yet there are a few things I would like to say in connection with the report. The committee has made a very thorough investigation of the condition of uncoupling arrangements and also of failures of couplers caused by railroad companies not buying couplers to the recommended specifications of the association, also of not having them given the M. C. B. test. The committee has shown recommended changes in the uncoupling attachments which go far towards reducing the number of parts we are now using, also in strengthening the weak parts. I am of the opinion that a straight uncoupling arrangement can be made applicable to the couplers, as recommended by the committee, that would do away with many of the undesirable features of the overhead uncoupling arrangement.

It is a well known fact that the overhead coupling lever cannot be used under all circumstances. Many locomotive tenders are equipped with buffers so that when they are coupled on to freight cars with overhead uncoupling arrangements, they either make them inoperative or they cannot operate them.

It is true that in the past we had one make of side uncoupling lever which was not just satisfactory, but there are thousands of couplers running today with the side operating rods that are a success and can be applied by having only two parts, the rod and the attachment to the end sill; while with the overhead uncoupling lever we have two brackets to hold uncoupling rod in position together with the chain and clevices. Although I am a member of the committee and have signed the report as it contains so many good features I particularly want to call attention to this lever feature so that we can make further experiments on the same and see if we cannot get better results with the side than we do with the overhead.

J. W. Marden (B. & M.): In regard to the uncoupling device on couplers, I am thoroughly in accord with the suggestions for improvements in these parts, from the fact that the breakage of uncoupling chains is one of the most serious things we have in the safety appliances, and I would be very glad to see a side uncoupling device for our couplers. I have always been a believer in dead blocks. About nine years ago I built a hundred 80,000-pound box cars equipped with the M. C. B. couplers, and at the time constructed the couplers with dead blocks, malleable iron casting with spiral spring. I issued instructions to all inspectors and foremen to notify me especially of any damage occurring to these cars, so that I might follow it up, and while I have not with me the exact data, I will say that these 100 cars have cost the road 50 per cent less for repairs than any other 100 cars we have running.

F. H. Stark (Pittsburgh Coal Co.): As to the question of embodying in the specifications the chemical analyses, we all know we had a great deal of difficulty in providing the analysis in a physical test for axles, and the axle makers absolutely refuse to abide by both. If we have members on the committee that are competent to take up the chemical side of it, well and good; but I doubt whether the present committee—I can speak positively for myself—is able to take a hand in that part of it. But if we provide a physical test, it seems as though we should leave it to the manufacturers who make a study of it, to make the analysis. So far as changing the contour is concerned, it is quite evident that the time has not arrived to do this, for the reason that the railroads are not buying these new couplers today, all the railroads, that have the present standard, hence we must first reach that point before we make another change.

As to the operating, I wish interested parties would go home and ascertain what causes the failures. It it not shifting loads—there is only one load of timber or rails where there are hundreds of other cars containing other products, and yet the operating chains are out of order. Many cars

bunch in the head of the coupler and the operation of the coupler breaks the chains. I think a side attachment, suspended on brackets or hangers of some sort would be put out of service far oftener than the overhead arrangement. The angle cocks are knocked off by this cornering of cars and unless we can have a side attachment, in our coupler that can stand all kinds of abuse, we should go a little slow. If we had some better arrangement of wire cable, possibly that would be a move in the right direction, but the committee does not feel that the time is ripe to make any radical change, but would rather let the members make tests of their own.

Mr. Marden spoke of a hundred cars. A hundred cars are lost sight of, and will never give a satisfactory test.

The committee has in mind the tests suggested by Mr. Sanderson and the plans of the committee as outlined, will take in all these laboratory tests. If you will trust the committee for another year, we assure you that many of these valuable tests will be gone over again and verified, and everything possible will be done for the members of the association.

C. A. Schroyer (C. & N. W.): I am going to vote for the report of the committee, but not because I think the uncoupling apparatus which it proposes is the best that could be had. Every time this apparatus is coupled to a passenger car, the buffer face plate of the car will distort, or destroy the overhanging rod. The great cause of breakage of links and clevices is the fact that they are made of malleable iron, and malleable iron is much more reliable than steel. I am not in favor of a specification which embodies the chemical analysis, because I do not believe it is a fair thing to the maker to lay down a formula by which he shall make the steel, and then require that the steel made by that formula shall stand a certain physical test. I am strongly in favor of dead blocks on cars, and I favor the use of a wooden dead block, whether on a steel or a wooden car, because a wooden block has the property of absorbing shock without destroying that which is back of it, to a much greater extent than any metal we know of, and I am in favor of it from the standpoint of economy, because the great damage is done to cars when the drawbars are broken out and they come together without wooden dead blocks between them.

Mr. Sanderson: I move the discussion on this subject to suspend until after the discussion of the interchange rules. (Motion carried.)

Mr. Hennessey then presented the report of the "Arbitration" committee and Secretary Taylor read a supplemental report as follows:

It has been called to the attention of the committee that at certain interchange points the practice exists of making local inspection rules which do not conform to the M. C. B. rules. As it is thought the M. C. B. association should be fully responsible, and should exercise full control over the rules of interchange in so far as inspection is concerned, it is recommended that a third paragraph should be added to the preface as follows:

"All inspection of freight cars for interchange will be made in accordance with the following rules:"

Rule 8, page 5.—Your committee would change its recommendations to read as follows:

"Seams ½ inch long or over at a distance of ½ inch or less from the throat of the flange, or seams three or more inches long if such seams are within the limits of 3¾ inches, as shown on Figure 5, page 10."

Rule 34, page 14.—Your committee would modify its suggestion regarding this rule, making the rule read:

"If the car has air signal or steam pipes, the hose, pipes and couplings on the car are at owner's risk unless the car is stencilled that it is so equipped." This proposed change is suggested in order to make the provisions regarding steam and air pipes the same.

Rule 62, page 19.—Your committee suggests a modification of its recommendation as follows: Add a new sentence reading "Malleable iron couplers, open knuckles and malleable or steel back filled journal bearings shall not be used in repairs of foreign cars."

Rule 65, page 21.—

1. Your committee would make an additional suggestion, that is, that the size of the horizontal or cross bolts shown in Figure 9 A should be ⅝ inch.

2. It has been called to the attention of the committee that a large number of cars have sills spliced with a butt form of splice similar to that shown in the enclosed print, which at some interchange points have been rejected as not conforming to M. C. B. standard. The claims made for this form of splice indicate that it is the equal of the present M. C. B. splice in strength, although this has not been demonstrated to the satisfaction of your committee. That cars spliced with this form of splice may be kept in service and that the form of splice may be thoroughly considered, your committee would recommend the addition of the following:

"Sills of foreign cars shall be spliced in accordance with the standard form of splice shown in the M. C. B. rules. Cars delivered in interchange with the form of splice shown herewith will be acceptable."

Your committee would suggest to the executive committee the appointment of a special committee to investigate the relative advantages of the two forms of splice.

The attention of your committee has been called to an evident error in the credit for journal bearings in the passenger car rules as shown on page 88. This credit should be the same as in the freight car rules, and it is therefore suggested that the credit for the scrap journal bearings should be 15 cents per pound instead of 11 cents per pound.

Mr. Sanderson: I move that the decisions of the "Arbitration" Committee be formally accepted by this association. (Carried.)

Mr. Sanderson: I move that the report and recommendations of the "Arbitration" Committee with regard to the Master Car Builders' rules, with the amendments read by the secretary be approved by this convention as a whole. (Carried.)

The discussion on "Tests of M. C. B. Couplers" was then resumed. After brief discussion Mr. Muhlfeld's motion was carried.

F. F. Gaines (Cent. of Ga.): I wish to approve thoroughly Mr. Sanderon's remarks. Several years ago I was connected with a road which had its cars equipped with dead blocks. Later they were taken off. I was then master mechanic and had charge of repairs on my division. Car repairs, as regards train wrecking work, certainly did increase and I think if we get back to a dead block it will be a good thing.

Prof. H. Wade Hibbard: I notice the statement in this report that the ordinary pulling and buffing force when train is in motion does not exceed 40,000 pounds when the train is handled by one engine. This spring we tested one of the large Mallet compounds giving a draw bar push of over 70,000 pounds. What is going to take place with your drawer bars when that engine is put in front, as I believe it will be?

The report of the committee was on motion accepted and its recommendations ordered referred to letter ballot.

The report of the standing committee on "Revision of Rules for Loading Long Material" was next presented.

A. Kearney (N. & W.): There are two questions before us—do you wish to advance these rules from recommended practice to a standard; and how do you wish this matter handled where reference is made to loading material in closed cars. The recommendation of the committee is that they be advanced, and I make the motion that the rules we have prepared here showing the rules for carrying material in closed cars be made a portion of the rules and not carried as an appendix. (Carried.)

On motion the recommendations of the committee were referred to letter ballot.

On motion the rules for loading long materials were advanced from recommended practice to a standard, subject to approval by letter ballot.

The next report presented was that of the committee on "Cast Iron Wheels."

Mr. Lockwood: In connection with the paper as printed, in the absence of Mr. Garstang, it becomes necessary for me to say that this report is not signed by the entire committee. We have one dissenting vote, Mr. Muhlfeld, who has a minority report that he wishes to present.

Mr. Muhlfeld presented his minority report and after discussion the subject of "Cast Iron Wheels" was recommitted.

D. F. Crawford (Penn. Lines West): It hardly seems possible that the committee will submit a report at this convention, and as it is necessary to include in the rules of interchange a suitable gauge for use with the M. C. B. standard wheels which we are all using I move that the openings in this gauge be changed from 1 1-16 inches to 1 inch for wheels under cars of 80,000 and 100,000 pounds capacity and be changed from 1 inch to 15-16 inch for wheels to be used under cars of less than 80,000 pounds capacity. (Carried.)

The report on "Journal Box and Pedestal for Passenger Cars with Journals 5 by 9 and 5½ by 10 Inches," was presented and referred to letter ballot.

The report on "Marking of Freight Equipment Cars" was next presented and referred to letter ballot.

The report on "Air Brake Hose Specifications" was received and the Committee continued.

C. A. Seley (C. R. I. & P.) moved the reconsideration of the "Rules of Interchange," adopted this morning, so far as the air brake hose was concerned, which was carried.

F. H. Stark: I move that this matter of air brake hose be referred to the executive committee with power to act and to change our "Rules of Interchange" to correspond with its action with the understanding that it is the consensus of opinion of this body that the date should be changed to September 1, 1909. (Carried.)

The Secretary: The matter will be considered by the executive committee and the "Rules of Interchange" will be arranged in accordance with their decision.

Mr. Seley: I move that any topical discussion omitted by pressure of other business, be read only by title and included in the proceedings, if the authors of written discussion will kindly present their remarks to the secretary. (Carried.)

The report of the committee on "Automatic Connectors" was presented and on motion of E. W. Pratt (C. & N. W.) was received and the committee continued with instructions to investigate further.

The report of the committee on "Lateral Bracing of Steel Freight Cars" was received and the committee continued to investigate the service conditions relative to steel underframe and all-steel cars to see if it cannot find some general specification for the application of the lateral brace, especially between the body bolster and the end sills.

The report of the committee on "Side Bearings and Center Plates for Freight and Passenger Cars" was presented by Mr. Sanderson, and Mr. Muhlfeld spoke in support of Mr. Crawford's minority report. No action was taken on the recommendations. The committee was continued and instructed to conduct both laboratory and service tests of anti-friction center plates and side bearings.

The report on "Steel Passenger Cars" was presented but the lateness of the hour prevented discussion at this session.

The committee on "Nominations" reported the following ticket:

President—R. F. McKenna.
First Vice-President—F. H. Clark.
Second Vice-President—T. H. Curtis.
Third Vice-President—LeGrand Parish.
Executive Committee—J. E. Muhlfeld, C. E. Fuller, H. D. Taylor, J. F. Walsh, C. A. Schroyer.

Adjourned.

LATERAL BRACING OF STEEL FREIGHT CARS.*

A circular of inquiry issued by your committee met with responses representing 40 per cent of the total number of cars represented. The information elicited shows such a marked division of opinion and practices that your committee does not feel competent to present a recommendation on lateral bracing for steel cars which would be acceptable even to a small minority of the association.

After defining the term lateral bracing to mean either gusset bracing at the connection of bolster and longitudinal sills, or diagonal strutts between the bolster and end sill, it developed that no steel underframe cars were reported without lateral bracing in one form or another. Different designs of cars require different treatment as to their lateral bracing, so that it would be impossible to design a bracing arrangement suitable for application to all classes of cars.

Concerning the upperframing of box cars, there are quoted two replies received in answer to the question as to what is considered the essential features in the design of framing of superstructure for steel box cars. These replies are fairly representative of all the suggestions offered, either one of which has considerable merit.

"Would consider as an essential feature in the design of steel underframing the use of standard sections, angles, channels, and Z bars, with as simple and direct connection to sills and plates as possible. Would tie the corner members back with metal girths to all side members extending back to door posts. Would consider the side framing as carrying its proportion of the lading and structure, and proportion the members accordingly. Would give the end lining full bearing against end framing, which would be moderately heavy and well secured and thereby resist the shocks of shifting loads. It is well-nigh impossible to do this in wooden car construction, and one of the strongest points for steel superstructure is in the above advantage."

"A light frame steel side with riveted gusset connections at the corners and junctions of diagonal braces with posts and sills. On account of its depth this side truss can be required to carry a considerable portion of the load to the bolster, which will deliver it direct to the center plates. It is desirable to have this steel framing exposed, use no outside sheathing, but use double lining of say 1¾-inch tongue and grooved timber carriage bolted to steel frame. The ends of the car must be of fairly heavy steel construction, also made of 1¾-inch inside lining, flashing to be used at the top of the lining to insure watertight joints. Steel carlines and light steel plate roof protected from damage by boards above."

There were only four roads reported as having experience with metal upperframing for box cars, and in consequence your committee does not feel that a conclusion can be drawn from the experience obtained from these examples which would warrant it in presenting a standard design of upperframing for the consideration of the association.

The committee does not believe that the work delegated to it by the association can be accomplished with any degree of satisfaction at the present time and therefore recommends its discharge.

*Abstract of a report presented at the annual convention of the Master Car Builders' Association at Atlantic City, N. J., June, 1908, by a committee consisting of R. B. Kendig, W. F. Bentley, W. F. Eberle, W. T. Gorrell and F. W. Dickinson.

ADDITIONS TO MASTER CAR BUILDERS' ROLL CALL.

Bradley, John E., Osgood-Bradley & Sons, Traymore.
Bradshaw, J. H., Insp., Am. Cotton Oil Co., Windsor.
Brown, W. A., M. M., K. & M., Wiltshire.
Dillon, S. J., M. M., Penn. Co,
Gaskill, C. S., A. E. M. P., P. B. & W. Ry., Chalfonte.
Gauthier, J., M. M., Copper Range, Elmwood.
Gray, B. H., S. M. P., M. J. & K. C. Ry., Traymore.
Hayes, A. C., G. C. F., N. Y. Cen. Lines, Monticello.
Hibbard, Prof. H. Wade, Sibley College, Richmond.
Keegan, J. E., S. M. P., Grand Rapids & Ind., Shelburne.
McKee, G. S., S. M. P., M. & O., Dennis.
Maher, P., S. M. P., C. & Alton R. R., Marlborough-Blenheim.
Marden, J. E., G. F. C. D., Boston & Maine, Clyde.
Mitchell, A. E., N. Y. N. H. & H., Chalfonte.
Monkhouse, H., Compressed Air Co.
Moser, E. L., C. D., P. & R. R. R., Haddon Hall.
Onderdonk, J. R., Engr. Tests, B. & O. R. R., Marlborough.
Parker, T. E., Supt., Cudahy Refr. Line, Marlborough.
Rosing, W. H. V., M. E., Mo. Pac., Chalfonte.
Sage, Ralph V., C. E., Cambria Steel Co., Brighton.
Schroyer, C. A., S. C. D., C. & N. W., Marlborough-Blenheim.
Smith, B. T., G. F., West Jersey & Seashore R. R., Jackson.
Vaucla'r, C. A., Inspector, P. R. R., Glenmore.
Voss, Wm., Amer. Car & Fdy. Co., Canfield.
Webster, H. A., M. M., New York, St. Charles.
Wyman, R. L., M. M., Lehigh & New England, Edison.

THE EXCEL AUTOMATIC COUPLER.

The question, "What constitutes a first-class automatic car coupler?" which is one of the most important confronting railway mechanical men of the present day, has been answered by one of the pioneers in the coupler business and who is in attendance at the convention. His points may be arranged as follows:

A first-class coupler is composed of only three parts—the bar, the knuckle and the lock. The lock should be of one piece, eliminating chain attachments, inclines or "kickers" of any description, since it is recommended that the coupler have a lateral swing of five inches.

The unlocking attachment should invariably be attached to the coupler so as to travel with it under any and all conditions that the relation between the lock and the opening of the knuckle may be the same at all times.

Another important matter is doing away with the pivot pin. The pin is the cause of great expense to railroads in maintenance and of at least 65 per cent of couplers being out of gauge after a short period of service, not only on account of the great amount of wear upon the pin and in the pin holes but also in the bar and knuckle.

It will be understood that doing away with the pin hole in the lugs will obviate breakage of the coupler lugs and also of the knuckle at the pivot hole.

It has been fully demonstrated within the past 15 years that couplers containing springs, kickers, inclines, swinging locks, etc., within the head have proved after a short service to be of little value and have caused loss of life or limbs to many railroad employees when engaged in the attempt to make the coupler operative. It is claimed that there is on exhibition a coupler which embraces the points herein outlined, and that it can be seen in the space occupied by the Scullin-Gallagher Iron & Steel Company.

REVISION OF RULES FOR LOADING LONG MATERIAL.*

Your committee on "Rules for Loading Long Materials," recognizing the desirability of making as few changes as possible in the present rules, have confined their attention to such rules as it would appear could be still further improved to meet the requirements. The corrections and additions we would recommend are as follows:

Rule 11.—The rule reading as it does provides for maximum overhang of 18 feet at a width of 8 feet, 1 inch, as given in the table accompanying the rule, but it seems that shipments are quite frequently offered containing pieces exceeding that length, but not enough, perhaps, to warrant changing the general method of assembling the load on the car, which would necessarily mean providing braces and clamping pieces on the two cars in the form of a tandem shipment. At the same time it would appear perfectly feasible to load beyond this overhang, in fact up to 24 feet, provided we keep the width of the shipment to 5 feet, and provided the average length of the overhang of total load does not exceed 18 feet. This requirement seems necessary on account of preserving the center of gravity of the shipment, and putting the rule in this way makes it entirely clear for the average inspector.

New Rule 11.—The width of overhanging load placed on single cars must never exceed the following dimensions. When all the pieces are of approximately the same length the length of overhang should not exceed 18 feet, but shipments may contain pieces overhanging as much as 24 feet provided the average length of the overhang of the total load does not exceed 18 feet.

Length of Overhang. C	Width of Load W	Length of Overhang. C	Width of Load. W
9 ft. 0 in.	9 ft. 5 in.	18 ft. 0 in.	8 ft. 1 in.
10 ft. 6 in.	9 ft. 2½ in.	19 ft. 6 in.	7 ft. 0 in.
12 ft. 0 in.	9 ft. 0 in.	21 ft. 0 in.	6 ft. 4 in.
13 ft. 6 in.	8 ft. 9½ in.	22 ft. 6 in.	5 ft. 8 in.
15 ft. 0 in.	8 ft. 7 in.	24 ft. 0 in.	5 ft. 0 in.
16 ft. 6 in.	8 ft. 4 in.		

The overhang is measured from center of truck to extreme end of overhang. See Figures 23 and 24.

Rule 13.—The rules now provide that the top of stakes be tied together with either boards of specified dimensions or with a specified number of strands of good ⅛-inch diameter wire. But it would seem that some latitude should be consistently given in this respect by allowing the use of another diameter of wire so long as the strength of the tie is preserved. With this in view it has been suggested that we also provide for the use of a 3-16-inch diameter wire where found more convenient, substituting it for the specified wire, using the equivalent number of strands as shown in the following:

Addition to Rule 13.—Three-sixteenth-inch diameter wire will be accepted as a substitute throughout the rules, provided the ends are securely twisted:

Two strands or 1 wrapping of 3-16-inch wire will be equivalent to 6 strands (3 wrappings) ⅛-inch diameter wire.

Four strands or 2 wrappings of 3-16-inch wire will be equivalent to 10 strands (5 wrappings) ⅛-inch diameter wire.

Rule 15-E.—Notwithstanding a number of shipments are offered which are more or less flexible and necessarily require the sliding as well as the bearing pieces, at the same time there are also a number of shipments stout enough of themselves to hold up clear of the intermediate portion of the car or braces. It is therefore recommended that the rule be made more explicit by changing it to read as follows:

New Rule 15-E.—"For twin or triple loads of long flexible material, which require more than two sliding pieces in addition to the bearing pieces, the weight of lading must not exceed one-half the capacity of the car if load consists of plates or similar lading, as per Figure 43. Structural material of less flexibility, such as heavy channels and I-beams, must conform to Rules 15-A and 15-B, and should be loaded as per Figures 41 and 42."

Rule 31.—Reference to Figure 11 at the top of page 15 should be omitted.

Paragraph following table on top of page 15 referred to "Loads as per Figure 11" should be omitted, as the conditions of equipment existing at the time this rule was framed seem to be disappearing and the requirements are fully covered in Rule 15 with its several sections.

Rule 69.—The latter part of this rule reading: "When such shipments are loaded in stock or box cars, it must be placed crosswise of car at doorways," referring to closed equipment, found its way into the rules by mistake and should be omitted from this portion of the rules but will be hereinafter referred to.

Figure 23.—Reference should be made to Rules 11, 73 and 77.

Figure 24.—Reference should be made to Rules 11, 73 and 77.

Rule 75.—In order to insure security of shipments of deep girders the recommendations are that the following general instructions be provided and made a part of the rules, making it Rule 75-A, and also adding its cut as Figure 31-A.

New Rule 75-A.—"Deep girders, whenever possible, should be loaded horizontally. Girders having a depth of more than 2½ times the base, if loaded vertically, must be blocked apart to prevent overlapping of flanges and tied together to prevent independent side motion. See Fig. 31-A. This tying should be sufficiently strong and secure to practically combine all the girders so that they must act as one piece. In addition the load must be carefully blocked to prevent shifting sidewise or endwise."

Rule 77.—In this rule reference should be made to the length of overhang and total length of load, also to Figures 23 and 24, making the rule read as follows:

New Rules 77.—"If overhang (C) exceeds one-third the total length (L) of load as per Figures 23 and 24, the opposite end must be securely bolted through bearing-piece to floor by means of ⅞-inch bolts."

Rule 89.—The clause reading "they must be braced to prevent shifting sidewise" should be inserted after the word "Car" in fourth line and then follow with present reading of rule. After this is inserted the rule should be closed by adding the following clause: "Wooden underframe cars with two truss rods must not be loaded in this manner."

New Rule 89.—"When plates are loaded on single cars, except all steel and steel underframe designs, and the lengths of the plates are such that it becomes necessary to lap the plates on each other at the centre of the car, they must be braced to prevent shifting sidewise and bearing-pieces not less than six by eight inches in section and in length corresponding to the distance between the sides must be placed on the floor of the car above the cross bearers to prevent the breaking down of center sills and stringers as shown in Figures 37 and 38. Wooden underframe cars with two truss rods must not be loaded in this manner."

Rule 90.—In the latter part of this rule it is provided that when the load consists of I-beams measuring 18 inches and over or similar material lying flat on bearing pieces, or when there is danger of the flanges cutting into the bearing pieces, the webs of such material should be supported by web pieces, etc. The suggestion has been made that this method of loading be not limited to 18 inches; on the contrary the rule should be made sufficiently flexible to take care of I-beams of any dimensions, provided the load is less than 40,000 pounds per bearing piece, which would be taken care of by making the latter part of the rule read:

"When lading consists of I-beams or similar material lying flat, and the load is 40,000 pounds or more per bearing piece, or when there is danger of the flanges cutting into the bearing pieces, the webs of such material must be supported by web pieces or the lading must be placed on pivoted bolsters."

Rule 98.—Provision should be made in this rule for the necessary chocking to prevent end and side motion for such shipments, and the rule would then read:

New Rule 98.—"Rails, bar iron, channels, angles, etc., should, whenever possible, be loaded on single cars inside of end gates, which must in all cases be raised and securely fastened. Rolling freight must be chocked to prevent side and end motion."

A rule, should be provided for the loading of pig iron, short billets, and the recommendations are that the following rule should be inserted with its cut as Rule 98-A and Figure 45-D.

New Rule 98-A.—"Pig iron, short billets, small castings, and material of similar character, should, as far as practicable, be loaded in flat floor gondola cars, and the door openings need not be boarded over. The lading, however, must be loaded over the bolsters. But, should a few pieces not exceeding one layer in depth shift over doors in transit, be the doors either flush with top of floor or bottom of sills, the shipment will be considered acceptable provided the doors and door mechanism are in good condition. Drop-end gondola cars must have the end gates raised and secured.

"When flat cars are selected the lading must have end and side protection, consisting of plank of sufficient height and at least two inches in thickness placed against stakes spaced not more than six feet apart, and of the required dimensions as per Rule 12.

"When hoppers or self-cleaning hoppers are selected the doors must be securely boarded over as per Figure 45-A."

*Abstract of a report presented at the annual convention of the Master Car Builders' Association at Atlantic City, N. J., June, 1908, by a committee consisting of A. Kearney, L. H. Turner, W. F. Kiesel, G. S. McKee, F. H. Clark, C. E. Fuller, A. Stewart and J. S. Lentz.

Rule 104.—Add another section to Rule 104, making it Rule 104-A, reading as follows:

New Rule 104-A.—"Strutts must be neatly fitted and driven into place."

Rules Governing Loading Stone.

Rules 118, 119 and 120.—In order to better take care of the shipments of small as well as large stone it is recommended that these three rules be reconstructed so as to make the requirements more clear to the inspectors, at the same time cover a larger variety of loads offered for shipment.

118. Small stone, such as rip-rap, spawls, paving blocks, brick, tiling, etc., should be loaded in gondola cars. The lading may be loaded over drop doors, not boarded over, provided the doors and door mechanism are in good condition.

119. Flagging, dressed or sawed stone, such as building granite, marble and similar stone, should be loaded in gondola cars, and must rest on two or more softwood strips of sufficient thickness, placed flat and crosswise of car, to keep stone clear of floor.

If loaded on flat cars in piles not over 30 inches in height, the lading must, in addition to prescribed stripping, have side and end protection consisting of hardwood plank or cross braces of at least 1-inch thickness nailed against inner side of stakes to the height of lading. When the lading is over 30 inches in height the same precaution must be taken with reference to end and side protection, but stakes must extend at least four inches above lading and tops of opposite stakes must be wired together with two wrappings, equal to four strands of good ⅛-inch diameter wire. Stakes must be placed not more than four feet apart, and of the required dimensions as per Rule 12.

If flat cars are used for the shipment of sawed stone, such as trimmings, coping, etc., used for building purposes, the longer lengths should be placed to the outside of the lading and the shorter lengths placed inside.

120. Large flagging, block, breakwater or grindstones, with approximately straight as well as any with uneven faces must be loaded in cars with substantial side and end protection, must be well chocked and wedged to prevent shifting and rocking, and must rest on wood strips of sufficient thickness placed crosswise of car to keep stone clear of floor as provided in Rule 119.

If loaded on flat cars, the lading must, in addition to the prescribed stripping, be secured with hardwood stakes or cleats, to prevent side and end shifting, as per Rule 12 and 119, Figures 62 and 63.

Rule 121.—This rule governing the loading of boiler shells and tanks, in its present shape does not seem to be either fully explicit or to cover the requirements. The following substitution is therefore recommended:

New Rule 121.—"Lading of this description eight feet or less in diameter, when loaded on single flat or gondola cars, should be substantially staked and chocked with blocking in height equal to one-seventh the diameter of the shell. When the cylinder or shell is more than eight feet in diameter the same precaution should be taken with reference to staking and blocking, and in addition to that it should be secured with two bands of not less than ¾-inch round iron or flat bands of equal section.

"When such lading is placed upon two or more cars as a tandem shipment it should be secured with two bands of not less than ⅞-inch round iron or flat bands of equal section in addition to the prescribed blocking."

New Rule 122.—It is recommended that the following rule be added to No. 122 with its cut, Figure 64: "Large pieces of plate glass carried on flat cars should be loaded vertically, if practicable, and substantially secured by cleats on the floor end and side braces as provided for in Figure 64."

New Rule 123.—It is recommended that the following rule be added as No. 123: "Cars with racks, when loaded with material such as scrap junk, should have the space between the slats sufficiently sealed to prevent loss of material, or ends of pieces working through, and the top of load should be securely tied down with a sufficient number of strands of good ⅛-inch diameter wire to prevent any of the lading from rolling off."

New Figure 62.—It is recommended that new Figure 62 be added showing lading of stone as per Rule 118.

New Figure 63.—It is recommended that new Figure 63 be added showing lading of stone as per Rule 119.

New Figure 64.—It is recommended that new Figure 64 be added showing lading of plate glass as per new Rule 122.

This completes the recommendations for the improvement of the rules pertaining to the loading of material on open cars, and they are now respectfully submitted for your consideration. There are, however, two other matters that should be mentioned. First is the proposition made on the part of the committee on "Standards," from which we received a communication some time since asking that we bring before the committee for consideration and recommendation the advisability of advancing the rules from that of recommended practice to standard of the association. The other subject is the consideration of a number of rules covering suggestions for loading material in box and stock cars, where the doors are left open so that the inspector can readily make the necessary examination.

As for advancing the rules from recommended practice to standard the majority of the committee would favor that recommendation and, in point of fact, believe it would indeed make but very little difference from the way it is now handled at interchange points, except some change might be brought about in the matter of responsibility, and, we assume, the cost of reloading and restoring the shipments to a condition satisfactory to the rules. It is also true that while the present rules are considered safe they simply represent methods generally recognized as being good practice, and it is reasonable that variations can be made in detail still preserving the integrity and safety of the shipments. Whether this condition will open up possibilities for unnecessarily holding up traffic and improper billing is a matter that should receive the most careful consideration. However, it is the recommendation of the majority of the committee that they be advanced from recommended practice to standard.

The general rules and recommendations alluded to for loading some of the more prominent commodities in closed cars have been prepared, and are submitted herewith for such action as you may deem advisable. While your committee is mindful of the fact that the subject, as it was given the committee and as it has been handled heretofore, specifically covers the loading of material on open cars, this phase of the proposition seems to be more or less a live one and therefore pertinent to the general subject, as many roads now seem to view these rules as wise recommendations, and generally, methods or requirements that should be issued for the information and guidance of inspectors. It is the recommendation of your committee, however, not that they be made a part of the existing rules for loading long material on open cars, but be shown as an Appendix under the heading of "Rules for Loading Material in Box or Stock Cars Where the Opportunity Is Provided for Inspection."

The articles covered in this proposed appendix as submitted include barrels, barrel staves, ties, fence posts, wooden billets, tires, car wheels, scrap junk, sewer pipe and drain tile.

CAST IRON WHEELS.*

The recommendations of the committee, in its report for 1907, having been submitted to letter ballot and accepted as an entirety by the association by affirmative vote on each and all of the recommendations, has limited the committee in its work during the past year to suggested additions, alterations and revisions pertaining to the subject, presented by Secretary Taylor, as well as individual members, as follows:

The wheel effect and worn coupler limit gage now appearing on M. C. B. Sheet 12, and showing three slots for gaging worn wheel flanges, has been recommended for revision as shown on WC-1908-3 with two slots for gaging worn flanges, for the following reasons: The worn coupler and wheel defect gage, as presented to the association in 1907, in which 1-inch, 1 1-16-inch and 1⅛-inch slots for gaging worn flanges were shown, has, on account of the ⅜-inch radius used, been criticised for the reason that the fillets at the throat of worn wheels on which this gage would be used, differ from the radius on the gage, thereby preventing the latter from properly seating in the throat and resting on the tread, which results in the gage not being applied perpendicularly and renders the uniform condemning of wheels an impossibility, notwithstanding that the ⅜-inch radius recommended by the committee is very much closer to the actual fillet in the throat of worn wheels than the radius used on the M. C. B. gage, which was standard prior to the committee's report.

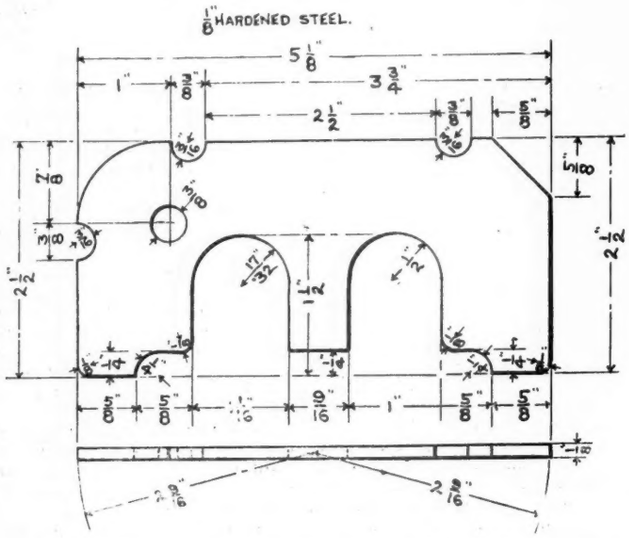
This gage has been further recommended for revision in the elimination of the 1⅛-inch wide slot for condemning wheels under 100,000 pounds capacity cars.

The committee, in investigating both of these points, is unanimously of the opinion that both are well taken and it presents Sheet WC-1908-3 and WC-1908-4, showing a proposed new gage and method of using it to cover these points, and which it is possible to use in condemning worn M. C. B. standard wheels alike, whether they have the standard flanges in vogue up to 1906 or the strengthened flange of wheels cast under the standard of 1907.

The present "M. C. B. Recommended Practice" for cast-

*Abstract of a report presented at the annual convention of the Master Car Builders' Association, at Atlantic City, N. J., June, 1908, by a committee consisting of William Garstang, A. S. Vogt, H. J. Small, W. E. Fowler, R. L. Ettinger and R. F. McKenna.

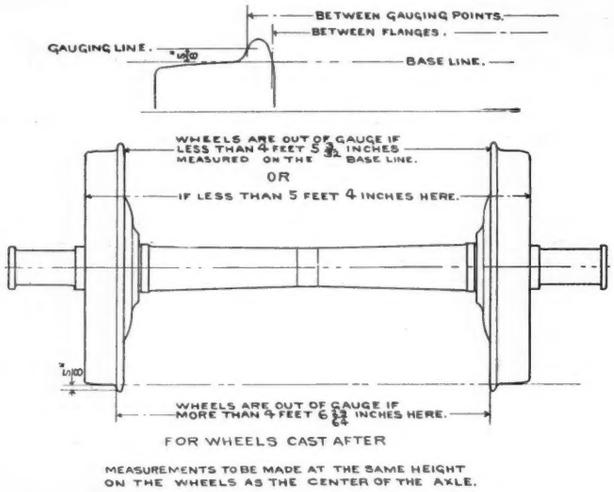
iron wheels as shown by Sheet J, which requires 14 brackets supporting the tread and flange at the back face of the wheel adjacent to the single-plate portion, has been criticized for the position of the brackets, which it is claimed does not



Cast Iron Wheels—W. C. 1908-3—Wheel Defect and Coupler Limit Gage.

follow good foundry practice, and also for their shape, which it is stated permits unequal strains to be set up in the wheel when cooling. Attention having been invited to these details by Mr. Muhlfeld, the committee, after investigation, is unanimous in its opinion that the objections are well taken, and presents Sheet WC-1908-5 as covering the desired changes.

The committee's attention was also invited by Mr. Muhlfeld to the question of regulating foundry practice in the manufacture of cast-iron wheels to promote uniformity of product in the different sections of the country in order that

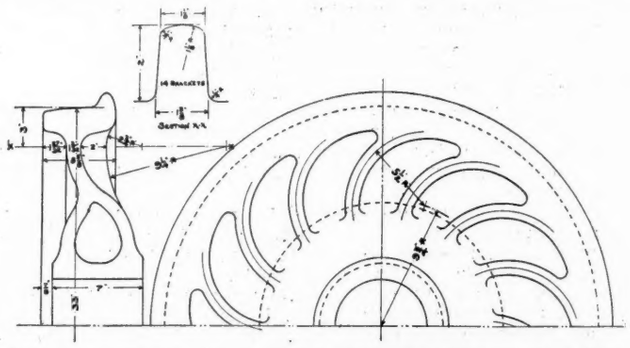

BETWEEN GAUGING POINTS.
BETWEEN FLANGES.
GAUGING LINE.
BASE LINE.
WHEELS ARE OUT OF GAUGE IF LESS THAN 4 FEET 5 3/32 INCHES MEASURED ON THE BASE LINE.
OR
IF LESS THAN 5 FEET 4 INCHES HERE.
WHEELS ARE OUT OF GAUGE IF MORE THAN 4 FEET 6 53/64 INCHES HERE.
FOR WHEELS CAST AFTER
MEASUREMENTS TO BE MADE AT THE SAME HEIGHT ON THE WHEELS AS THE CENTER OF THE AXLE.

Cast Iron Wheels—W. C. 1907-6—Figure 6A.

wheels applied under interchange rules, regardless of the place of manufacture, would have the same chemical characteristics as well as physical properties under the M. C. B. specifications. The importance of such action on the part of the M. C. B. association, providing a harmonious and concerted action on the part of the wheelmakers can be secured, would greatly benefit interchange service between the railroads forming this association, particularly on account of the heavy capacity cars now in general use, but owing to the lateness of the hour at which this point was presented, and the impossibility of securing coöperation of the wheelmakers, the committee does not feel that sufficient data regarding foundry practice in charging cupolas with particular reference to the percentage of new pig-iron, scrap wheels, etc., and the ladle analysis of the molten metal can be secured, unless a harmonious and concerted action on the part of the wheelmakers working jointly with your standing committee can be arranged; and their joint labors with this end in view would consume not less than one year in formulating a definite report. The committee has, therefore, no recommendations to make on this phase of the subject.

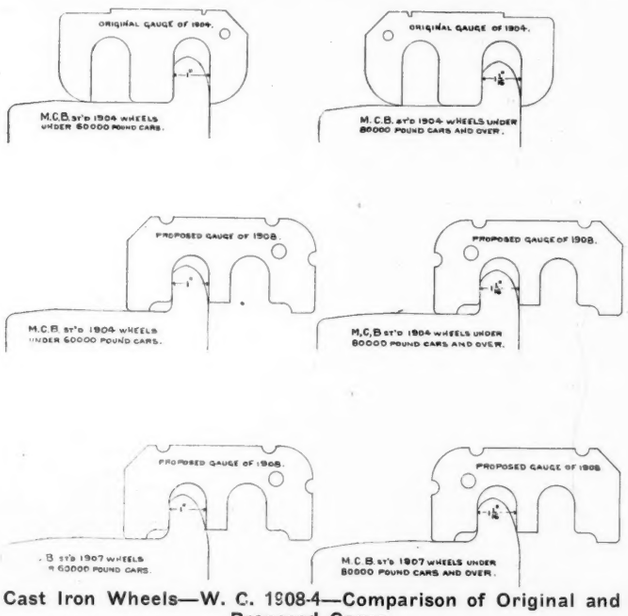
The attention of the committee has been directed to the fact that none of the cuts published in the Proceedings show in detail with necessary dimensions the contour of the tread and flange for steel tires. The suggestion has been made that M. C. B. Sheet A of "Recommended Practice" be revised to show in detail with all necessary dimensions the contour of the tread and flange for steel tires, and the title of the sheet altered to include "Tread and Flange for Steel-tired Wheels." The committee is of the opinion that this should be done, making this correspond to the contour of the wheel tread and flange (from the outside of the tread to the point of the flange only) shown on M. C. B. Sheet A now used for cast-iron wheels. Action on this point should be taken by the association, as it is beyond the province of this committee to include same in its recommendations.

In concluding the report to the association in 1907, the committee recommend that a service record of the perform-



Cast Iron Wheels—W. C. 1908-5—Proposed Standard for Ribs on 600 to 700-Pound Wheels.

ance of the new wheels be maintained by the members of this association, for a sufficient period of time to determine what the wheels would do under the increased wheel loads and mileage, so that, if it was desired by the association to adopt a guarantee, that the actual performance of the wheels could be used in determining what the guarantee should be.


ORIGINAL GAUGE OF 1904.
M.C.B. st'd 1904 WHEELS UNDER 80000 POUND CARS.
ORIGINAL GAUGE OF 1904.
M.C.B. st'd 1904 WHEELS UNDER 80000 POUND CARS AND OVER.
PROPOSED GAUGE OF 1908.
M.C.B. st'd 1904 WHEELS UNDER 80000 POUND CARS.
PROPOSED GAUGE OF 1908.
M.C.B st'd 1904 WHEELS UNDER 80000 POUND CARS AND OVER.
PROPOSED GAUGE OF 1908.
PROPOSED GAUGE OF 1908.
M.C.B. st'd 1907 WHEELS UNDER 80000 POUND CARS AND OVER.

Cast Iron Wheels—W. C. 1908-4—Comparison of Original and Proposed Gages.

After one year's experience with the new wheels, the committee is of the opinion that at least the leading railroads of this country have complied with this request and that there is now sufficient data in the hands of the individual members that can be used by the committee in framing a proposed guarantee, provided the association votes that one be framed.

The recommendations of your committee, together with

the revised drawings, are presented in the following, and at the conclusion of same we quote from our 1907 report certain rules and paragraphs that need revision to make them conform to the requirements of the new standards, and recommend that the latter be referred to the committee having these rules in charge for the necessary corrections.

Wheel effect and worn coupler limit gage, marked WC-1908-3, to replace cut of worn coupler limit and wheel defect gage, now appearing on M. C. B. Sheet 12.

WC-1908-4, and to be printed in the "Code of Rules Governing Interchange of Traffic."

WC-1908-5, to supersede the brackets now appearing on Sheet J of "Recommended Practice" for radius and position in plan only.

The following recommendations are quoted from your Committee's report for 1907, and to which attention has previously been called.

WC-1907-6 is an addition to Figure 6 now appearing in "Code of Rules Governing Interchange of Traffic," and particularly referred to in Rule 17. (The new cut, Fig. 6-A, should be printed in the code of rules.)

The drawings of the wheel as a whole, as presented, and the printing of the cuts for each weight of wheel on separate sheets, at large scale so that all dimensions may be easily read.

The printing of cuts of the wheel tread and flange as presented to be at large scale to enable dimensions to be easily read.

(Both these should be done and proofs submitted to the committee before printing.)

Rule 17, Page 487 (1906 Proceedings), to agree with Figure 6-A, Sheet WC-1907-6.

Paragraph, Page 632 (1906 Proceedings), relating to mounting wheels to agree with revisions presented as shown by Sheet WC-1907-6.

PEDESTALS AND JOURNAL BOXES FOR PASSENGER CARS.*

At the 1907 convention the committee on "Standards and Recommended Practice" made the following report on this subject:

"Your committee believes that this box and pedestal could be improved by being made nine inches in width, and suggests that it be referred to a special committee to make recommendations and propose designs."

This has special reference to the pedestal and box for 5 by 9-inch journal shown on M. C. B. Sheets C and E. The present outside width of the box between the pedestal fits is 8½ inches, which gives but 7½ inches inside width between walls, ½ inch less than on the freight car box of same size. This restricts convenient handling of the sponging, bearing and key, as well as giving too little room for using oil cans.

The committee has prepared a new drawing of the 5 by 9-inch passenger box, revised from that shown on M. C. B. Sheet C, with dimensions changed to give 8 inches inside width between walls, preserving other essential dimensions.

The drawing also includes some other revisions which your committee deems advisable.

Sheet M. C. B.—C shows the top corners of the box chamfered, no dimensions being given. This is for clearance of the equalizer, and we have increased the amount of chamfer both in length and depth to permit stronger equalizer construction.

The drawing has also had the end view corrected to show bottom edge of lid opening level to agree with the other two views as well as to make the lid opening of the same shape on all the freight and passenger boxes.

The committee also suggests slightly increasing the clearance between the outside dust guard wall and axle, and in 1-16 inch. The opening for the dust guard has been therefore increased a like amount to maintain the lap of dust guard on wall, thus better preventing dust getting into the box. The inner dust guard wall has been considerably modified in order to clear flanges of journal bearing, but it has been sufficiently retained to strengthen the box at the upper corners.

In offering this drawing for approval the committee would respectfully suggest that if it goes to letter ballot that the various changes be voted on separately and as follows:

A. Change of width to 9 inches outside; 8 inches inside of walls.

B. Increase of chamfer of top corners to 3½ inches in depth at sides; 6 inches between inside corners at top.

C. Change of outside dust guard wall opening, using 3¾ inch radius on top with center ¼ inch above center line and 3¾ inches radius below from center line, which includes increase of dust guard slot to 9⅛ inches wide.

D. Change of inside dust guard wall opening, using a height of 4⅛ inches above center line with 2 inches radii at upper corners, 3½ inches radius below with center ¼ inch below center line.

E. Addition of recess ⅛ inch wide, ⅜ inch deep at top of dust guard opening for dust guard wedge.

F. Change of width of central lugs and location of wedge stop to conform to the 5 by 9 freight car box.

G. Change of equalizer fit on top of box from 3½ inches to 4 inches.

H. Are you in favor of increasing width of front and back flanges on boxes to 1⅞ inches for additional wearing surface against pedestal?

There is also offered for approval a new drawing of pedestal for 5 by 9-inch boxes revised from that shown on Sheet M. C. B.—E increased in width between the jaws from 8⅝ inches to 9⅛ inches to take the box just described, also having revised the location of one of the bolt holes by which the pedestal is bolted to truck wheel pieces in accordance with the practice of some of the larger companies.

It is found that many trucks are in use having a width over wheel pieces not the same as called for on the drawing, so that offset of bolting flange is not much value as a standard, and as it would complicate the drawing so much to show the offset required for various widths, it is deemed not desirable to make any change in this respect. We have also increased the spacing of the bolt holes at the bottom which are used for bolting the tie bar, so as to use square-head bolts. The present spacing necessitates the use of T-head bolts, which are special and not generally as available as square-head bolts.

We also suggest removal of the bead or surface ribbing, making the outer face of the pedestal one continuous surface, of proper thickness at the bolt holes and guides and gradually rounding off to the outer edges. This modification does not sacrifice strength nor materially increase the weight, but it does improve the appearance and facilitates cleanliness. The smoother surface does not catch and retain the dirt as on present design, and is more readily wiped.

This drawing shows wearing bearing as formerly for 1-inch depth of flanges on boxes. If question H, under boxes, should carry in favor of the increase, it will be assumed to apply also on pedestal wearing face as to width.

This committee was also instructed to include in its recommendations designs for journal box and pedestal for trucks using 5½ by 10-inch journals.

The committee does not favor the use of this size journals in passenger service. They are not justified in six-wheeled trucks, and when cars are of the length and weight which would require greater axle capacity than is afforded by four with 5 by 9-inch journals, 6-wheeled trucks should be used.

It is found that very few roads have used 5½ by 10-inch journals in passenger service. If future development should bring about such a requirement, we are of the opinion that by that time the truck construction and material will have changed from present practice and our labor would be in vain, at least so far as the pedestals are concerned.

In order to fulfill our instructions the committee presented drawings showing designs of 5½ by 10-inch box and pedestal modeled on the general lines of those shown in the records and which are in use on a few passenger equipment cars.

These drawings are furnished by the courtesy of the Chicago Burlington & Quincy. The committee suggests that they be reproduced in connection with this report as a matter of record and information for use at a later period if required, but not as "Standards" or "Recommended Practice" for reasons stated.

*Abstract of a report presented at the annual convention of the Master Car Builders' Association at Atlantic City, N. J., June, 1908, by a committee consisting of C. A. Seley, E. A. Benson and J. J. Tatum.

STANDARD MARKING OF FREIGHT EQUIPMENT CARS.*

The committee reviews the efforts which had been made to secure uniformity and avoid duplications in marking cars and gives a summary of the steps leading to action heretofore taken by the association and embodied in its standards and recommended practice.

The committee had a joint conference with a committee of the Association of Transportation and Car Accounting Officers, represented by J. W. Smith, superintendent car service, Western Maryland, and W. E. Beecham, of the Chicago

*Abstract of a report presented at the annual convention of the Master Car Builders' Association at Atlantic City, N. J., June, 1908, by a committee consisting of R. L. Kleine, T. H. Russum, W. O. Thompson, C. B. Young and J. F. Dunn.

Milwaukee & St. Paul, at which time it was decided that this committee had no jurisdiction in recommending the use of standard initials for reporting purposes submitted by the Association of Transportation and Car Accounting Officers. These reporting marks are fixed symbols for each railroad, consisting of not more than three letters, which, in a large majority of cases, do not correspond with the initials of the road for which they are intended. It was also decided that the suggestions submitted by the Association of Transportation and Car Accounting Officers at this meeting to place the initials and number between parallel lines is unnecessary.

In view of the various standards of marking in use by the railroads, many of which possess points of merit, and the fact that the construction of the cars regulates to some extent the location of the marking, your committee is of the opinion that the location of the marking should not be confined within narrow limits, but a "Recommended Practice" governing this should allow sufficient latitude to meet conditions and at the same time confine the location so that it will facilitate the work of car checkers, conductors, scale men, inspectors, and others, whose duty it is to take information from markings on cars.

Although the work assigned to your committee was to consider the location of the initials and numbers of cars, it was found that the locations of other markings were so closely allied to those of the initials and number that they have also been included in our consideration, subject to your approval.

With this end in view, your committee submits the following recommendations for your consideration:

Standards. (Page 579, Proceedings, 1907.)

a. Paragraph 1. Change to read: "That on all box cars standing more than 12 feet from top of rail to eaves, the height and width at eaves be stenciled in 3-inch letters on side of car, as near the bottom as convenient."

b. Paragraph 2. Omit: "That all box, stock and other roofed cars have the number and initials stenciled in 3-inch letters on outer face of outer floor timber between cross-tie timbers, except where cars are ceiled over underneath, in which case the stenciling shall be put on inside face of each cross-tie timber in center."

c. Paragraph 3. Change to read: "That all classes of cars have size of coupler, style of rear attachments, kinds of draft gear and style of brake beams stenciled in 2 or 3-inch letters on each side of car at opposite ends, or on each end of car directly above coupler where design of car permits. Where the kind of draft gear implies the style of rear attachments, the marking for the latter may be omitted."

d. Paragraph 5. Omit: "That on all cars equipped with air brakes, the words 'Air Brake,' in letters not less than three inches high, be stenciled on the sides or ends of the cars, and that the make of the air brake equipment be stenciled (in smaller letters if desired) over or just preceding these words, to enable inspectors to detect repairs made with wrong material."

e. Paragraph 6. Omit: "In 1902 the following additions were made to prevent errors in filling out M. C. B. defect and repair cards, and to at once identify the end of car on which defects are found or repairs made."

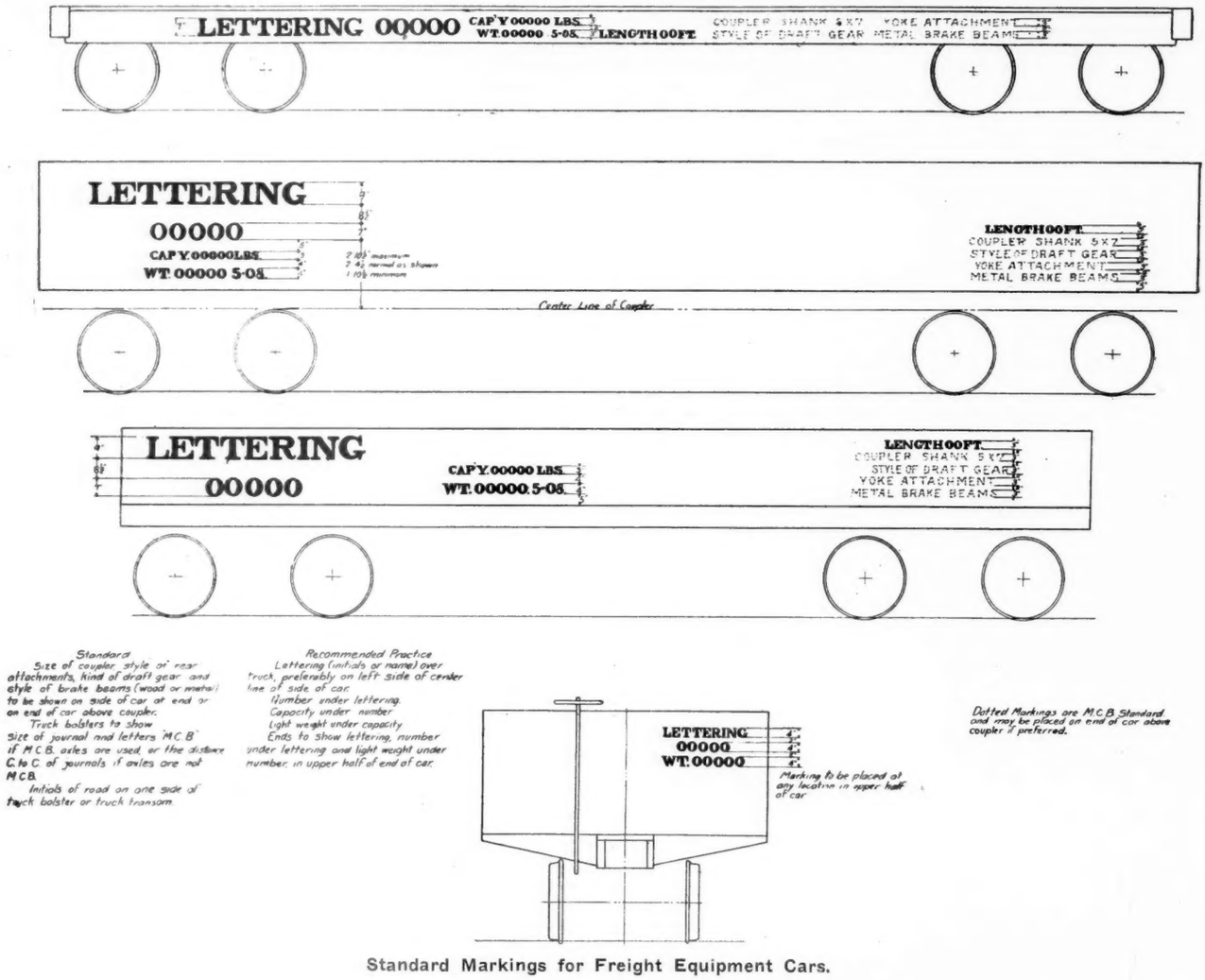
f. Paragraph 7. Omit: "All freight equipment cars used in interchange shall be stenciled with a letter 'B' on the end of car, etc., as shown in Figures 1 and 2, Sheet M. C. B. 24."

g. Paragraph 8. Omit: "The location of the lettering to be as near the center line, etc., on other classes of cars. See Figs. 3, 4 and 5, Sheet M. C. B. 24."

Recommended Practice.

h. Omit present "Recommended Practice on Marking Fast Freight Line Cars."

i. Add:


LETTERING 00000
CAP'Y 00000 LBS.
WT. 00000 5-08
LENGTH 00 FT.
COUPLER SHANK 5 X 7
YOKE ATTACHMENT
STYLE OF DRAFT GEAR
METAL BRAKE BEAMS
Center Line of Coupler
Standard
Size of coupler, style of rear attachments, kind of draft gear and style of brake beams (wood or metal) to be shown on side of car at end or on end of car above coupler.
Truck bolsters to show size of journal and letters 'M.C.B.' if M.C.B. axles are used, or the distance C. to C. of journals if axles are not M.C.B.
Initials of road on one side of truck bolster or truck transom.
Recommended Practice
Lettering (initials or name) over truck, preferably on left side of center line of side of car.
Number under lettering.
Capacity under number.
Light weight under capacity.
Ends to show lettering, number under lettering and light weight under number, in upper half of end of car.
LETTERING
00000
WT. 00000
Marking to be placed at any location in upper half of car.
Dotted Markings are M.C.B. Standard and may be placed on end of car above coupler if preferred.

Standard Markings for Freight Equipment Cars.

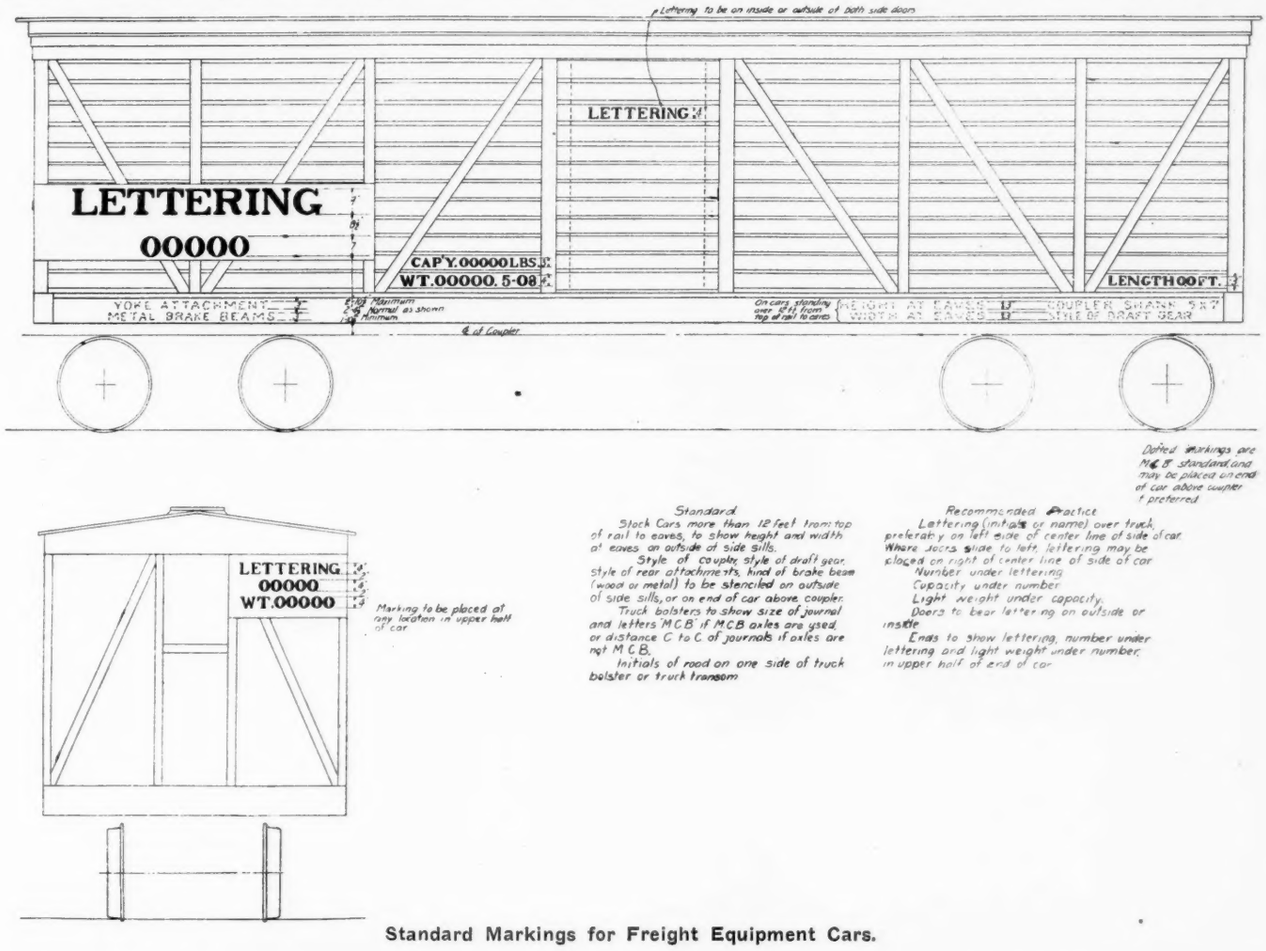
Marking on Freight Equipment Cars.

"1. Freight Equipment Cars that have a superstructure which will permit should be stenciled with markings on sides of car, in the following order:

Lettering (Initials or Name of Road),
Number,
Capacity,
Light Weight.

"This marking is to be located as nearly over the truck as the lettering will permit, preferably to the left of center line of side of car. On box and other house cars where doors slide to the left, the above marking may be placed to the right of center line of side of car. On any other cars where the construction makes it necessary, this marking may be placed either to the right of center line of side of car, or in the center of side of car. The distance from the center line of coupler to the bottom of car number to be normally 2 feet 4½ inches, with a minimum dimension of 1 foot 10½ inches, and a maximum of 2 feet 10½ inches. The spacing of the remaining marking to be as shown on diagram.

"2. The ends to show the initials or name of road, car number and light weight, in the upper half of end of car.


Lettering to be on inside or outside of both side doors
LETTERING
LETTERING
00000
CAP'Y. 00000 LBS.
WT. 00000. 5-08
LENGTH 00 FT.
YOKE ATTACHMENT
METAL BRAKE BEAMS
Maximum
Normal as shown
Minimum
℄ of Coupler
On cars standing over 10 ft. from top of rail to eaves
HEIGHT AT EAVES
WIDTH AT EAVES
COUPLER SHANK 5X7
STYLE OF DRAFT GEAR
Dotted markings are M.C.B. standard and may be placed on end of car above coupler if preferred.
LETTERING
00000
WT. 00000
Marking to be placed at any location in upper half of car
Standard
Stock Cars more than 12 feet from top of rail to eaves, to show height and width at eaves on outside of side sills.
Style of coupler, style of draft gear, style of rear attachments, kind of brake beam (wood or metal) to be stenciled on outside of side sills, or on end of car above coupler.
Truck bolsters to show size of journal and letters 'M.C.B.' if M.C.B. axles are used, or distance C. to C. of journals if axles are not M.C.B.
Initials of road on one side of truck bolster or truck transom
Recommended Practice
Lettering (initials or name) over truck, preferably on left side of center line of side of car.
Where doors slide to left, lettering may be placed on right of center line of side of car.
Number under lettering.
Capacity under number.
Light weight under capacity.
Doors to bear lettering on outside or inside.
Ends to show lettering, number under lettering and light weight under number, in upper half of end of car.

Standard Markings for Freight Equipment Cars.

On box or other house cars having end doors this lettering should be so located that it will not be obscured when doors are open.

"3. Flat and low-sided gondola cars should show the lettering (initials or name of road), number, capacity and light weight on the side of car in the best available location offered by the construction of the car. Suggestions as to the arrangement of this lettering are shown on the diagrams. When possible the sizes of lettering and figures should correspond with present 'Recommended Practice.' The end marking on flat cars may be omitted.

"4. Side and end doors should be stenciled with the initials or name of road either on the outside or inside of door. If placed on the inside the stenciling should be so located that it will not be defaced by the sliding of the door."

Drawings showing the proposed markings are, herewith, submitted.

Your committee would also call attention to the elaborate advertising on the sides and ends of some cars and would recommend that the practice be discouraged, as it very often involves employing experts in freight repair shops to reproduce the original intricate designs when repairs to siding are necessary.

In conclusion we would suggest that the "Recommended Practice for Stenciling Cars" be so arranged that the marking of the cars and the size of stencils appear consecutively in the proceedings.

REVISION OF THE RULES OF INTERCHANGE*.

Rule 1, page 2.—Add the words "and adjusting brakes" in the third line after the word "inspection," and omit the word "and" before the word "inspection."

Rule 2, pages 2 and 3.—Insert after the word "form" in the fourth line of second paragraph "filled in with ink or black indelible pencil," to conform to the requirements for defect and repair cards. Change the name of card to "Bad Order Return Card," and make the card 3½ by 8 inches.

Rule 3, pages 3 and 4.—Change the car number and initials from top to bottom of card to assist bill clerks and others who examine defect cards when bills have been rendered.

Rule 8, page 5.—Change the rule to read: "Seams ½ inch long or over at a distance of ½ inch or less from the throat of flange, or seams three or more inches long on any other point of the tread."

Rule 10, pages 5 and 6.—Change to read: "Worn flange: cast wheels under cars of less than 80,000 pounds capacity, with flanges having flat vertical surfaces extending more than one inch from tread, or flange 15-16 inch thick or less gauged at a point 17-64 inch above tread.

"Wheels under cars of 80,000 pounds capacity or over, with flanges having flat vertical surfaces extending more than ⅞ inch from tread, or flange less than one inch thick gauged

*Abstract of a report presented at the annual convention of the Master Car Builders' Association at Atlantic City, N. J., June, 1908, by Joseph W. Taylor, secretary, on behalf of the "Arbitration" committee.

at a point 17-64 inch above tread." Rest of rule to remain at present.

Rule 11, page 6.—W. R. McKeen, Jr., suggests changing rule to read: "Thick flange: flange over 1 7-16 inches thick for cast-iron wheels, standard of 1903, 4, 5 and 6, or flange over 1 19-64 inches thick for cast-iron wheels having increased flange and tread, standard of 1907 (see Figs. 2 and 2a)." The committee approves the suggestion and has recommended to the "Wheel" committee that it redesign the present maximum flange thickness gauge to cover both dimensions.

Rule 14, page 6.—Add the words "cracked or" before the word "broken" in the first line.

Rule 17, page 6.—The rule should show gauging points for wheel with increased flange and tread (Fig. 6a), and the committee has recommended to the "Wheel" committee that it redesign Fig. 6, page 11, to conform to this suggestion.

Rule 18, page 6.—Omit the words "if chip is on outside of flange" and insert "if chip is on the opposite side from throat of flange."

Rule 21, page 9.—The gauges in Figs. 1, 3, 4, 4a and 5 should be so changed as to eliminate the throat radius, and a note added to Fig. 6, as follows: "For wheels cast prior to the new M. C. B. standard tread and flange adopted in 1907."

Also a new cut showing the manner of gauging wheels with the new M. C. B. form of wheel tread and flange adopted in 1907 should be added. The committee has recommended to the "Wheel" committee that it submit a standard location of marking with a standard marking for wheels.

Rule 22, page 12.—The subheading under the caption of "Axles" should be changed by omitting the words "defects of," making it read: "Axles which justify renewal."

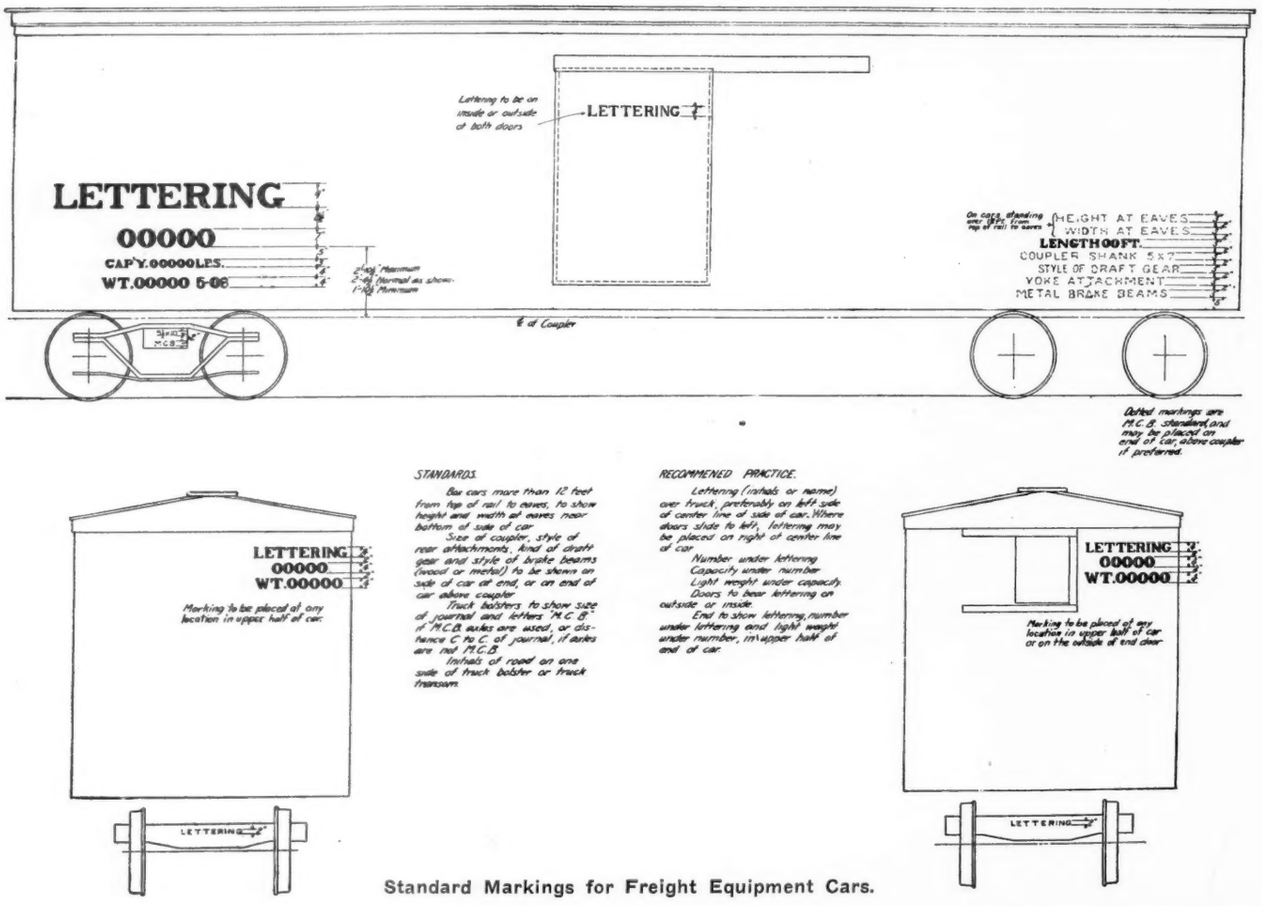
Rule 25, page 13.—The subheading under the caption of "Trucks" should be changed to read: "Parts of trucks which justify repairs if owners are responsible, or repairs or carding if delivering company is responsible."

Rule 28, page 13.—A new rule should be inserted as follows: "Cars equipped with steel wheels and so stenciled, if found with cast-iron wheels, delivering company responsible," and Rules 4 and 46 changed to include the number of this new rule.

Rule 29, page 13.—The committee recommends that "torn air hose" be eliminated from this rule, that the subheading under the caption of "Brakes" be changed to read: "Parts of brakes which justify repairs," and that the rules be rewritten so that all owners' defects and delivering companies' defects follow each other in sequence. Also the committee recommends that rule be changed to read: "Damage to interior portion of cylinder or triple valve, leaky pipes, account of seams, air hose burst from air pressure, torn air hose and defective missing or worn out parts of brakes not elsewhere provided for, which have failed under fair usage; except burst or torn air hose, burst or leaky pipes, account of seams, or missing material on cars offered in interchange."

Rule 30, page 13.—The committee suggests that the rule be changed to read: "Cylinder or triple valves of air brake cars not cleaned, oiled and tested within 12 months, and the date of last cleaning, oiling and testing, preferably marked on the brake cylinder or auxiliary reservoir, or if same is not readily visible, in a convenient location at release rod, with white paint."

Rule 32, pages 13 and 14.—The committee recommends changing the rule to read as follows: "Missing air brake


LETTERING
00000
CAP'Y. 00000 LBS.
WT. 00000 5-06
Lettering to be on inside or outside of both doors
LETTERING
HEIGHT AT EAVES
WIDTH AT EAVES
LENGTH OO FT.
COUPLER SHANK 5 x 7
STYLE OF DRAFT GEAR
YOKE ATTACHMENT
METAL BRAKE BEAMS
Dotted markings are M.C.B. standard, and may be placed on end of car, above coupler if preferred.
STANDARDS.
RECOMMENED PRACTICE.
Marking to be placed at any location in upper half of car.
Marking to be placed at any location in upper half of car or on the outside of end door.

Standard Markings for Freight Equipment Cars.

hose, missing or damaged air brake pipe, fittings, angle cocks, cut-out cocks, cylinders, reservoirs, triple valves, release valves, pressure retaining valves or any parts of these items; also pressure retaining valve and pipe when damage to car denotes rough usage (delivering company responsible)."

Rule 34, page 14.—Steam hose and fittings be included in this rule, and the words "pipe, valves, fittings" added. These items should be included with hose and couplings at owner's risk.

Rule 35, page 14.—The words "on and after September 1, 1908," are unnecessary when the new rules go into effect.

Rule 36, page 14.—This rule should be modified to read as follows: "All freight cars offered in interchange must be equipped with air brakes. On and after September 1, 1909, M. C. B. standard 1¼-inch train line shall be used."

Rule 37, page 14.—The words "on and after September 1, 1908," are unnecessary, and the committee suggests that the subheading under the caption of "Bodies" be changed to read: "Parts of bodies which justify repairs if owners are responsible, or repairs or carding if delivering company is responsible."

Rule 39, page 15.—There should be added the word

"rivets" after the word "bolts" in the last line, inasmuch as grabirons are fastened to the sides and ends of steel cars by rivets, and furthermore provision is made for applying them with rivets in the M. C. B. standards.

Rule 40, page 15.—A new sentence should be added, as follows: "Any card or poster which bears the name of a manufacturer or shipper printed on same will be considered as an advertisement."

Rule 44, page 15.—The words "tail-pin attachment" should be changed to "stem or spindle attachment," because a tail-pin attachment is generally known as a vertical pin in the yoke, whereas a spindle or stem attachment is meant in this rule.

Rule 46, pages 15 and 16.—The words "stem or" before the word "spindle" should be added to conform to change suggested in Rule 44.

Rule 48, page 16.—The words "filling block" should be omitted and the word "defects" in the subheading above this rule be changed to "damages."

Rule 50, page 16.—The words "filling block" should be omitted.

Rule 53, page 16.—The words "filling block" should be omitted.

Rule 56, page 17.—There should be added the words "except open knuckles," after the word "knuckle" in the explanatory note, the note to read: "The word 'coupler' in the above Rules 48 to 53 inclusive, means the coupler body or knuckle, open knuckles excepted."

Rule 58, pages 17 and 18.—Rule 59 should be made an exception in this rule, making it read, "except as provided for in Rules 59, 62 and 63." The committee would also suggest the omission of reference to Rule 63 from this rule, as no reference is made in that rule to standards, and it has no connection with Rule 59: "Filled bearings with shells of malleable iron or cast steel must not be applied to foreign cars in repairs."

Rule 59, page 18.—The following should be added after the first paragraph: "In making repairs, cast-iron brake shoes may be replaced with reinforced brake shoes."

Rule 62, page 19.—The committee suggests a new sentence as follows: "Malleable iron couplers and open knuckles must not be used in repairs of foreign cars."

Rule 63, page 19.—The second paragraph of Rule 77, page 28, should be combined with this rule inasmuch as it treats of the kind of repairs made, and should come under the heading of instructions to repairmen.

Rule 65, pages 20-22.—The rewritten rule should read:

"Draft timbers must not be spliced. All longitudinal sills may be spliced once, with the exception of center sills, which may be spliced at both ends. Not more than two adjacent sills may be spliced at the same end of car.

"The splice may be located either side of body bolster, but the nearest point of any splice must not be within 12 inches of same, excepting center sills, which must be spliced between body bolster and cross tie timbers, and not within 24 inches of either.

"Longitudinal sills other than center sills where less than 12 inches in depth, the plan shown in Fig. 8 is to be followed. When the sills are 12 inches or more in depth the plan shown in Fig. 9 is to be followed. When center sills are spliced the plan shown in Fig. 9a is to be followed.

"Steel sills may be spliced in the most convenient location in accordance with Figs. A, B and C. Adjacent steel sills may be spliced."

Rule 72, page 24.—The recommendations of the Association of Transportation and Car Accounting Officers as to stenciling car weights should be considered by the executive committee before incorporation in the rules of interchange.

Rule 77, pages 26 and 27.—The committee feels that changes could be made in the repair card with advantage and suggests that these changes be made a subject for committee work.

Rule 87, page 32.—The words "brake pins" should be inserted after "key bolts," in the fourth line, and "lever guides" added following "brake levers," in the fifth line.

Rule 89, page 35.—The rule should read: "Removing, turning and replacing a pair of steel or steel-tired wheels, $3.25 for pedestal type truck and $3.00 for arch bar truck."

Rule 94, pages 36 to 39.—The committee recommends the following prices:

Air brake equipment:	8 in.	10 in.
Angle cock, plain handle	$1.50	$1.50
Angle cock, self locking handle	1.80	1.80
Pressure retaining valve, two position	1.00	1.00
Pressure retaining valve, three position	2.25	2.25
Spring cotter pins for key-bolts and brake-pins, each	.02	.02
Coupler body, one, malleable, 5 by 5 inch shank, credit for scrap.	Ch'ge.	Credit. $0.90
Coupler body, one, malleable, 5 by 7 inch shank, credit for scrap.	....	1.00
Coupler lock, one, new	.40	.06
Half door, for end of furniture or carriage car, each, applied, no credit for scrap	3.00	....
Journal bearings, cast steel or malleable iron back, credit for scrap, per pound	....	.04
Labor, per hour	.24	....
Pipe, one inch, per foot	.05	....

Rule 105, pages 41, 42.—Add the following:

Putting on one handhold or grabiron, on wooden car, net ..... 25 cents.

Applying grabiron or handhold to steel car, where secured by rivets ..... 40 cents.

Rule 106, pages 42-48.—The committee recommends that the following changes and additions be made in the rule:

Change:

American continuous draft rods, one rod, welding ..... 2 hours.

Brake shoe, applied on authority of defect card when brake beam is not replaced ..... ½ hour.

Add:

Carrier iron bolts, 4 inches long or less, each ..... ¼ hour.

Substitute:

Center plate bolts, when same do not pass through draft timber, one or more or all at same end ..... 3 hours.

Add:

Coupler stop bolts, lug strap bolts or draft timber cross-tie bolts, 5 or less, at same end of car, when coupler is not replaced, each ..... ½ hour.

Coupler stop bolts, lug strap bolts or draft timber cross tie bolts, 6 or more at same end of car, when coupler is not replaced ..... 3 hours.

Change:

Center pin head, applied, loaded car ..... 3 hours.

Center pin head, applied, loaded car, and putting same on center ..... 5 hours.

Substitute:

Draft timber, one, renewed, when its center sill is renewed or spliced at same end of car ..... 2 hours.

Draft timber, one, renewed, when its opposite center sill at same end of car is renewed or spliced ..... 3 hours.

Combine:

Draft timber bolts, or carrier iron bolts, either or both, three or less, at one end of car, replacing ..... 2 hours.

Draft timber bolts, or carrier iron bolts, either or both, four or more, at one end of car, replacing ..... 3 hours.

Substitute:

Draft timber bolts when same do not pass through upper center plate, three or less ..... 2 hours.

Draft timber bolts when same do not pass through upper center plate, four or more ..... 3 hours.

Draft timber bolts when one or more of the bolts pass through the center plate, add ..... 3 hours.

(No additional charge to be made in this case if one or more or all of the center plate bolts at same end of car are renewed.)

Add:

Draft timber, one, renewed, when upper center plate bolts pass through rear end of draft timber ..... 10 hours.

Add:

Two center sills, spliced, ordinary car ... 22 hours.

Two center sills, spliced, refrigerator car. 26 hours.

Add following, Item 7, page 46:

One end sill under siding, renewed, when one or more defective sills have been spliced ..... 10 hours.

Add following, Item 8, page 46:

One end sill outside siding, renewed, when one or more defective sills have been spliced ..... 3 hours.

Change Item 15, page 47, to read:

Each side or intermediate sill spliced, when longitudinal sills have to be replaced, or when other sills are spliced at same end..... 3 hours.

Add:

Roof boards, single, including removing and replacing running board, per lineal foot ..... 7 cents.

Roof boards, double board roof, including removing and replacing running board, per lineal foot..... 9 cents.

Eliminate the item on page 47 reading "an additional charge of 75 cents shall be allowed in replacing intermediate or center sills on cars equipped with air brakes" and increase the number of hours allowed for replacing intermediate and center sills by three hours.

Change the heading top of page 48 to "Repairs of Steel or Steel Parts of Composite Cars."

Change the price of labor under repairs of steel cars to 24 cents per hour.

Rule 107, page 48.—Add "no charge to be made for adjusting brakes."

Rule 111, page 48.—Change to: "When one or more carrier iron bolts are replaced, where coupler at same end of car is removed and replaced for any other reason, the regular labor charge should be reduced one hour."

Rule 112, pages 48-55.—Add:

Emergency check valve, grinding in....10 cents.

Change:

Angle cock handle, removed and replaced, from .....7 to 4 cents.

Cut-out cock handle, removed and replaced, from .....3 to 4 cents.

Change: "The following table shows the labor charges allowable for air brake repair work," etc.:

Rule 113, pages 55-59.—The committee offers the following:

Trucks.

50,000 pounds capacity with metal transoms and wooden bolster, per pair...	$215.00
60,000 pounds capacity or under, with wooden bolster, per pair.....	215.00
60,000 pounds capacity, but under 80,000 pounds, all metal.....	315.00
80,000 pounds capacity, but under 100,000 pounds, all metal, per pair.....	400.00
100,000 pounds capacity, or over, all metal, per pair	425.00

Several inquiries have been received as to what constitutes a special stock car. The committee believes that the following revision of the rule will make it plainer:

"The bodies of refrigerator cars, stock cars permanently fitted for stall shipments, tank cars," etc. (rest of rule on page 59 to remain as at present). On page 60 the rule should be changed to read:

"In the case of cars equipped with racks for carrying coke and for other such purposes, and also stock cars other than those permanently fitted for stall shipments, with feeding and watering attachments, the actual cost of these equipments shall be added to the standard settlement prices for such cars."

Rule 117, pages 60-61.—The item of "worn-out parts of brakes as prescribed by Rule 29" should be added to the sixteenth line following the figures 22 and 23.

Rule 125, pages 62 and 63.—The matter of procedure in sending home damaged and worn-out cars should be taken up by the executive committee with the American Railway Association.

Rule 129, pages 64 and 65.—An index should be prepared of the rules.

Passenger Car Rules.

A committee, consisting of I. S. Downing, R. S. Miller and H. E. Passmore, was named to consider what changes were necessary in the "Passenger Car Rules" and report its recommendations to the "Arbitration" committee. The committee has performed its work and submits such changes as are thought desirable. The committee gives its view on the recommendations as follows:

1. Prefaced with preface of the "Freight Car Rules."

2. Rule 1. "Each railway company shall give to foreign cars while on its line the same care as to oiling, packing and inspection that it gives to its own cars, except in case of cars on which work is done under special agreement existing between the company owning cars and the road operating same." (Approved.)

3. Rule 6 (a). This should be eliminated. (Approved.)

4. Rule 6 (b). This should be eliminated. (Approved.)

5. Rule 10. Substitute in the last line "occur" in place of "is inflicted." (Approved.)

6. Rule 11 (a). Should be changed to read "Journals ¼ inch or more under the standard." (Not approved.)

7. Rule 11 (a). Add "Size of journal to be stenciled on truck." (Approved.)

8. Rule 11 (b). Substitute "occur" in place of "is inflicted." (Approved.)

9. Rule 11 (c). Charge for car heating should be 25 cents per day for heating car. (Recommended that the charge for heating cars be increased 15 cents per day.)

10. Rule 16, page 85. Sectional cuts of rolled steel and Boise wheel should be shown with limit dimensions indicating when wheels should be removed. (The committee would recommend that the limits of the different wheels, as illustrated by Figures 1, 2 and 3, page 85, be changed from 1 inch to 1⅛ inches, and Figure 4, page 86, be changed from 1¼ inches to 1⅜ inches, at last turning, and that text of Rule 16b be changed accordingly. The committee approves of the suggestion that illustrations of rolled steel and Boise wheels, with limit dimensions, be shown in this rule.)

11. Add new section to Rule 18: "Private or other cars except regular line cars when offered in interchange equipped with steam hose couplings that will not couple with the standard on the receiving line must be changed by receiving company. The hose removed to accompany car or be returned to delivering company." (Approved.)

12. Rule 20. The word "understood" should be eliminated. (Approved.)

13. Item No. 13, page 88, should read "anthracite coal." (Not approved.)

14. Item No. 60, page 90, should be eliminated, the price not being used. (Approved.)

It is suggested that in item 61, page 90, the price for loss of metal from steel-tired wheels, $2.00 per 1-16 inch, is too high, and should be given attention by the "Arbitration" committee. (The committee has considered this item, but does not approve of any change.)

Rule 19, page 87.—The New England Railroad Club suggests that this rule be amended to read as follows:

"The depreciation of all passenger equipment cars due to age shall be figured at three per cent per annum upon the yearly depreciated value of same, to continue not to exceed 50 per cent. of its original value. The above method of depreciation applies equally to either bodies or trucks of such cars. No depreciation shall be allowed on the value of air brakes."

This proposed change meets with the approval of the committee.

The committee believes the prices for cleaning, etc., are equitable, and that no changes should be made therein.

SIDE BEARINGS AND CENTER PLATES FOR FREIGHT AND PASSENGER CARS.*

The committee reviewed and gave a synopsis of reports on side bearings and center plates made to the association in the past, since and including 1900.

Circulars of inquiry were issued by the committee and the replies received are summarized as follows:

Answers were received from members representing 20 different railroads and one private car line.

(1) Reports received from nine roads using extensively the M. C. B. standard center plate, indicate that it has proven fairly satisfactory, and these roads have not asked to have the standard center plate changed.

(2) Eighteen out of 20 roads report that it is their practice to lubricate center plates at the time of application. Thirteen roads report that it is their practice to lubricate center plates at intervals, and one other road recommends this practice.

(3 and 4) Two roads using anti-friction center plates report favorably of them. Six roads express the opinion that it is desirable to use anti-friction center plates, although they have had no experience with them. Four roads using anti-friction center plates report favorably of them. Two roads are opposed to the use of anti-friction center plates, although they have had no experience with them.

(5) The spread of the side bearings on six-wheel passenger trucks is usually about 88½ inches, and the spread of the side bearings on four-wheel passenger trucks is about 60 inches. The information received was insufficient to enable us to determine what is the prevailing practice in regard to the height of side bearings.

(6) The replies indicate that the spread of side bear-

*Abstract of report presented at the annual convention of the Master Car Builders' Association at Atlantic City, N. J., June, 1908, by a committee of which R. D. Smith, R. P. C. Sanderson, Alfred Lovell and J. H. Manning are members.

ings on freight cars varied between 70 inches and 48 inches, and about one-half favored adopting 60 inches as standard.

(7 and 8) In most of the letters, the opinion was expressed that side bearings on passenger cars should be in contact, but should carry no load. The members were of the opinion that there should be no contact of the side bearings on freight cars.

(9) It was the opinion of all, that the nearer the side bearings are placed to the center plate the less will be the resistance of the trucks to turning.

(10) The reports indicate that there are some types of anti-friction side bearings which give satisfaction in service and some which give much trouble. Many of them are reported to fail on account of the rollers or balls wearing grooves in the plate, which causes the bearing to become fixed, and when in this condition it offers as much resistance as the ordinary solid type of side bearing, if not more.

Another reported cause for complaint is from the fact that on some types of side bearings the parts are liable to become lost or broken.

(11) The reports clearly indicate that it is the opinion of the majority that the relations of the center plates and side bearings to one another, their ease of operation, the efficiency of the design, the proper distribution of the load and the clearance of the side bearings, have considerable influence on the safe movement of the car.

(12) Very few tests have been made for the purpose of comparing ordinary center plates and side bearings with anti-friction center plates and side bearings.

The recommendations of the committee are as follows:

(1) Friction should be reduced as much as possible, and as hardness and rigidity of form have a direct bearing on this, and ample strength being important, your committee recommends the use of cast steel center plates for large capacity cars and malleable iron or cast steel center plates for smaller capacity cars.

(2) Your committee believes that it is desirable to lubricate ordinary center plates and recommends that this be done at frequent intervals.

(3) Taking into consideration the information which we have received as to the durability of anti-friction center plates, your committee can not now recommend their use as the standard practice of the Association, but consider further investigation desirable.

(4) While the resistance of the trucks to turning might perhaps be reduced by placing the side bearings nearer to the center plate than is the common practice, the tendency of the car to roll would be increased.

Your committee recommends adopting as standard for passenger cars:

A spread of 88½ inches center to center of side bearings on six wheel passenger car trucks with outside bearings.

A spread of 60 inches center to center of side bearings on four-wheel passenger car trucks.

That side bearings on passenger cars be placed just in contact but carry no load.

The various designs of trucks and bolsters in use, and the tendency to use steel construction, make it impracticable to recommend standard heights of side bearings or their height relative to the height of the center plate on passenger cars.

(5) Your committee recommends adopting as standard for freight cars:

A spread of 60 inches center to center of side bearings.

A clearance of not less than ¼ inch nor more than ⅜ inch between upper and lower side of bearings when new.

The various designs of trucks, bolsters and steel underframe constructions in use, made it impracticable to recommend standard heights of side bearings or their height relative to the height of the center plate.

(6) The investigations of your committee warrant it in stating that the use of anti-friction side bearings will reduce flange wear and lessen the probability of derailment.

As it is not proper to recommend as a standard any specific patented device, your committee recommends only, for passenger and heavy capacity freight cars, the use of side bearings embodying the anti-friction principle in any form that insures simplicity and durability to the greatest possible extent.

(7) In view of the importance of tests to be recommended later, your committee does not at present suggest any change in the M. C. B. standard center plate.

(8) There is evidence that derailments have in many instances resulted from the use of the side bearings carrying too great a proportion of the load when used with rigid underframes, and from the binding of improperly constructed center plates and side bearings, which causes the wheel flanges to crowd and climb the rail.

The greatest practical freedom of movement of the trucks which allows of their adjusting themselves to curvature and inequality of track is believed by your committee to be of vital importance, not only because there is less probability of derailment, but also because wheel flange wear and the danger from broken wheels is diminished.

Your committee therefore calls the attention of members to the importance of this matter and recommends to the association that an appropriation be made for the purpose of conducting further tests, not only of various forms of common center plates and side bearings, but also of different types of anti-friction center plates and side bearings. Tests should be made for the purpose of determining the best location of side bearings.

If such an appropriation is decided upon, your committee urges that tests be made of both new center plates and side bearings and such as have been in service under various conditions for a considerable length of time, and further recommends that such tests be conducted at one of the engineering universities, under the direction of a committee appointed by the association.

Minority Report.

D. F. Crawford, a member of the committee submitted a minority report as follows:

While recognizing the desirability of fixing uniform dimensions for as many parts of cars as possible, I can not agree to subscribe to the foregoing report, in so far as fixing the distance from center to center of side bearings at 60 inches for freight cars, when the investigation of the committee shows that freight cars are in existence having side bearings located from 48 inches center to center, to 70 inches center to center.

To definitely fix the location of side bearings would, in my opinion require more time and investigation than the committee has had opportunity to make since the last convention. I have been unable to find that a spread of 60 inches is preferable to a spread of either 48 inches or 70 inches.

STEEL PASSENGER CARS.*

The committee appointed to report upon steel passenger cars was directed to investigate that subject and advise the association on the following five headings:

(1) To consider the question generally, i. e., as to what is being done in this direction.

(2) To recommend a standard sectional area for the center sills and cover plates.

(3) To consider the relative merits of steel passenger cars with upper decks and those with a semi-elliptical section without an upper deck.

(4) To consider the best construction of flooring.

(5) To consider the relative merits of various materials for inside finish for fireproof construction.

The committee has been disappointed in receiving no replies to its inquiries from some companies which have built and used steel passenger cars, and which could have added information of value to the association if they had been so disposed. We have, on the other hand, been greatly assisted in our work by the exceptionally full and complete information, photographs and drawings from some of the railroad and car building companies.

While as early as 1854 designs of passenger cars were prepared by B. B. Lamothe, in which the superstructure was of metal but the end and sills remained of wood, very little progress was made until about 1902, when the question of the use of metals was prominently brought forward, for various causes, among which may be mentioned as the most important:

(a) The burning of wooden cars in wrecks, and frequent destruction of human life by fire.

(b) The splintering of the large wooden sills, etc., when cars were wrecked, causing injury and death.

(c) The scarcity of lumber suitable for sills, stringers, etc., and the threatened exhaustion of such material.

While these three conditions are the most important, there are other reasons for the use of steel which may be mentioned, as, for instance:

(d) In collision with wooden freight cars the passenger equipment had some chance to escape from total destruction, but with the very large increase of steel freight cars this opportunity does not longer exist.

(e) Increased speeds, greater train length, and larger capacity of cars. Although the wooden cars have been improved by increasing the strength of parts affected, by the pulling and buffing stresses, by the use of metal platforms,

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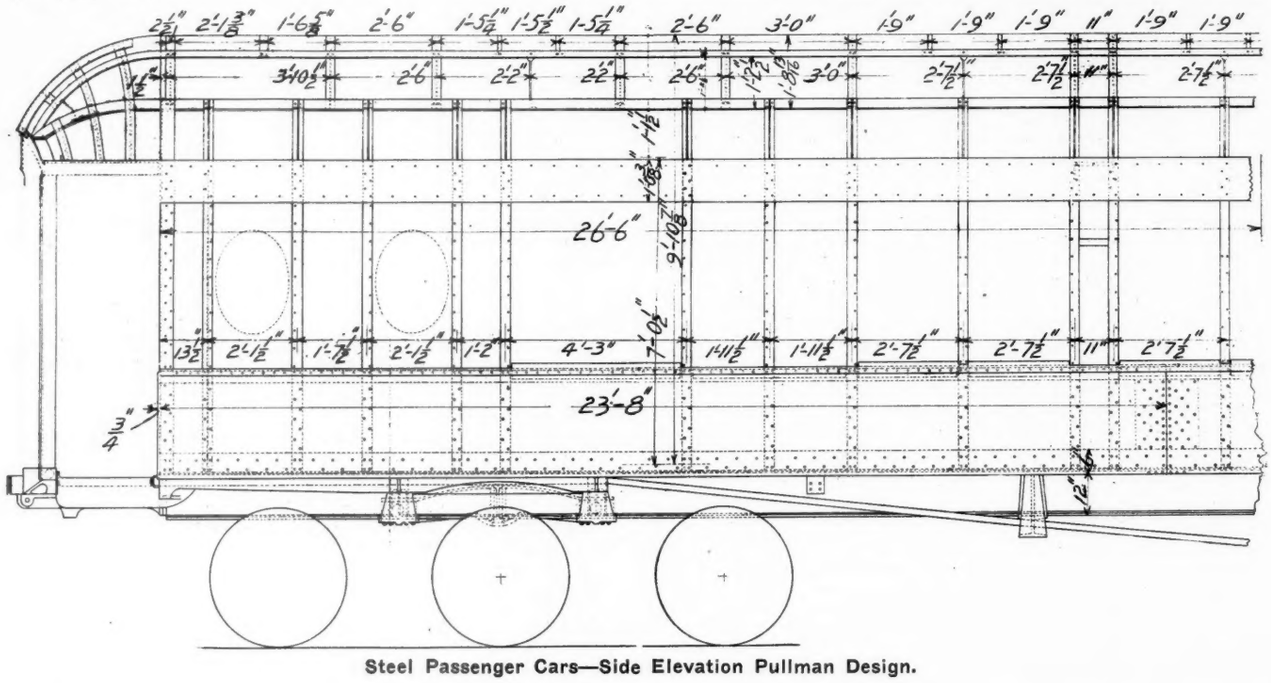
*Abstract of a report presented at the annual convention of the Master Car Builders' Association at Atlantic City, N. J., June, 1908, by a committee consisting of A. M. Waitt, W. R. McKeen, Jr., T. Dunbar, J. McE. Ames, C. A. Lindstrom, W. B. Ott and R. L. Gordon.

the application of vestibule buffers, etc., yet these expedients are little better than makeshifts.

The report continues with descriptions of various composite and steel cars including those of the Illinois Central (composite), the Pressed Steel Car Company (steel underframe and trucks), the Interborough Rapid Transit Company (all steel), Erie (all steel baggage), the New York Central (all steel motor car built by the American Car & Foundry Company), the Southern Railway (composite passenger coach built by the Pressed Steel Car Company), the Pennsylvania Railroad (all steel cars, 56½ feet and 70 feet in length), the Harriman lines (Southern Pacific and Union Pacific all steel cars), the Long Island Railroad, the Santa Fe (postal car), the St. Louis & San Francisco (baggage, mail and express cars illustrated in the Railroad Age Gazette, June 17, 1908), the Union Pacific motor cars, and the Pullman Company (sleeping car).



Steel Passenger Cars—Side Elevation Pullman Design.

Nine of these designs are illustrated by plates accompanying the report. [The illustrations of the Pullman steel car are shown herewith, as this car has not been described previously. The leading features of the other cars have been illustrated in the Railroad Gazette and The Railway Age.—Eds.]

A general idea of the extent to which the all-steel principle is being applied to this class of equipment may be obtained from the following statement. This statement is not necessarily complete, but covers all the different motor type of cars of which the committee could learn:

Table No. 1.

Road.	No. Cars.	Service.	Built.
Interborough Rapid Transit	300	Subway electric	1904
Long Island Railroad	134	Suburban electric	1905
New York Central	125	Suburban electric	1906
Hudson Terminal	50	Subway electric	1907
Rock Island	1	Motor for surface tracks	1907
Lackawanna	1	Motor for surface tracks	1907
Interborough Rapid Transit	50	Subway electric	1907
New York & Queens County	40	Trolley electric	1907
Union Pacific	20	Gasoline motor for surface tracks	1906-7
Boston Elevated	45	Electric elevated	1907
Philadelphia Elevated	80	Elevated and subway electric	1906
Union Pacific	22	Gasoline motor (Under construction)	

Pullman Company Steel Sleeping Car.

The designing and construction of an all-steel sleeping car presents a somewhat more difficult problem than that of an ordinary coach. Nevertheless, the Pullman Company has given the matter considerable study and attention during the past few years, and early in 1907 completed an experimental car, "The Jamestown." This car was also, to a certain extent an exhibition car, and it was one of the efforts of the builders to produce, as nearly as possible, a composite steel car without suggesting in its appearance the use of steel.

The car is equipped with Pullman standard 6-wheel trucks, and with a combination cast-steel bolster and platform. The coach is 72 feet 6 inches long over end sills, and accommodations are provided for thirty passengers, which is the capacity of the latest sleepers constructed of wood.

The center sills are composed of 12-inch 40-pound I-beams, covered on top with ½-inch plate 30 inches wide, running the full length of body. These center sills are trussed with 1⅞-inch rods. Between the bolsters are four cross bearers, at equal distances apart, to transmit a certain portion of the load on the side of the car to the center sills. The side sills consist of 6 by 6 by ½-inch angles, which also act as the bottom flange of girders forming the sides of the car to the height of the window sills, the web of which is ¼-inch plate and the top flange a 3 by ⅜-inch bar. The latter is reinforced by means of 2 by 2 by 5-16-inch angles framed in between the posts. The rest of the exterior, together with the roof, as well as the interior head linings and side finish, are composed of No. 14 sheet metal. The interior finish includes paneled steel, aluminum and brass. Between the sheets on the sides and ends of car are two thicknesses of asbestos boards for insulation purposes. The window frames are of brass. The floor is of ¼-inch steel plate, on which, with an intervening air space, is laid corrugated metal, and on top of this a layer of ½-inch of Monolith cement.

The builders advise that the riding qualities of this car are exceptionally good, and although it was feared at first that the vibratory noises would be annoying, the car is as free from this as any up-to-date sleeper of wooden construction. For the sake of appearances, countersunk rivets were used in the outside sheets.

The Pullman Company has also prepared other designs, in one of which a deep fish-belly box girder is used for center sills, while in another design a fish-belly of angle lattice work is provided in connection with 10-inch channel center sills. The length of these cars is to be the same as "The Jamestown." It is possible that one of these designs will be used in the construction of the next cars to be built.

Since receiving replies to our circular of inquiry, the committee is advised that a second steel sleeping car of one of the later designs has been constructed and is now running regularly on the "Overland Limited."

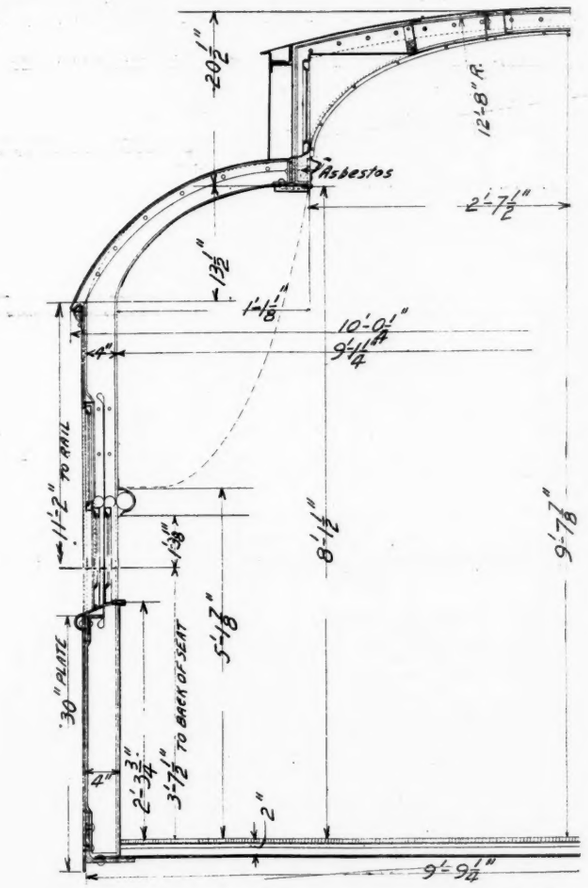
European Steel Car Construction.

While steel underframe cars have been in use in Europe for 40 or 50 years, or perhaps longer, there are very few passenger cars being built in any of the shops visited in the various countries enumerated, in which passenger cars were

built, with steel upperframes as well as with steel underframing, the general practice being to place a wooden body on a steel underframe and covering the outside of the body with 1-16-inch steel plates, which gives the appearance of the steel car, these steel cover plates being secured with small screws to the wooden posts, sill and braces.

The underframe is constructed in numerous ways, some being of the fish-belly type, made either in pressed steel or of plates and angles, and the other types being usually I-beam or channel side sills held from deflection by means of truss rods in the way usual on wooden cars. The construction of these underframes is, however, of such nature, due to the quite different way in which the draft riggings are applied to European cars, that nothing of importance can be learned from them, the draft arrangements being of the continuous type and the buffing stresses being taken on side buffers. These cars have no heavy center sill construction, as is required on American cars, where not only the pulling, but also the buffing stresses are generally taken by the center sills.

A notable feature in connection with European cars is that all trucks, whether 4-wheel or 6-wheel, used on the later equipment, are made of steel, no wooden trucks being used.



Steel Passenger Cars—Cross-Section Pullman Design.

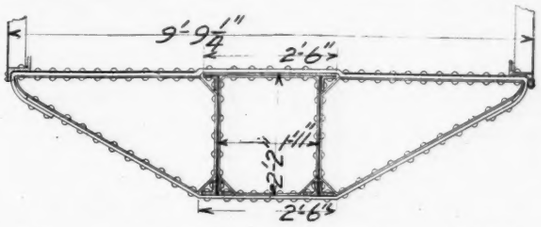
The steel trucks are of various constructions, but the majority are of pressed steel of either the Fox type or types resembling the Fox. A number of trucks are, however, in use in which the side framing and cross framing are composed of I-beams, channels and angle irons.

As far as could be learned by conversation with engineers and builders of railroad cars, no consideration or study is being given to the development of an all-metal passenger car, and no attempt is even being made to utilize the steel plates on the outside to carry part of the lading, the total load being carried on the underframe, regardless of the construction of the upper framing.

General Remarks.

The development of a steel passenger car from what has been said in regard to what is being used abroad, may be considered an American innovation of the last few years. On account of the lack of available data the progress has necessarily been slow, and generally of what may be called an experimental nature.

The development in steel motor cars seems to have been more rapid than in steel railway cars. This is probably due to the fact that the service in which the motor equipment is used is such as to make protectionary measures against injury from fire of primary importance; whereas, with the steam cars the development seems to have been retarded for the same reasons which were advanced against the steel freight cars when they were first introduced—i. e., first cost, excessive weight, difficulties of repairs, corrosion, etc., limiting the life of the cars. These objections have, however, been—through the experience obtained with steel freight cars—practically eliminated; as, for instance, the cost, which was



Steel Passenger Cars—Cross-Section Pullman Under-frame.

the feature given the most consideration, is now not so important as the question of providing a car sufficiently strong for the service regardless of a somewhat increased first cost.

The increased cost of a steel passenger car over a wooden car of the same general construction and size, and with the same specialties, should not be very great when a number of cars of the same design and general type are built. The few, of what may be called sample cars of steel, enumerated herein, which have been built in the past, have, of course, been very costly as compared with wooden cars, but this has been due to the great cost of getting up designs, appliances, etc., for their manufacture, all of which will be greatly reduced in the future, and especially on larger orders for cars. It should always be borne in mind when the use of steel cars is contemplated, that such cars may be obtained at very much less cost if some type of car is decided upon, of which cars have already been built, instead of making new designs, often embodying a number of changes more or less important, which in many instances could be dispensed with.

The question of weight of steel passenger cars was perhaps the next important consideration, but from what has already been accomplished the problem seems to have been solved, and if proper care is exercised in the design, so as to place the material in the car to the best advantage for strength, etc., there is no reason at all why the construction of cars containing all steel, or steel and partly non-inflammable material, can not be produced, which cars would be much stronger than wooden cars, and with practically no increase of weight per passenger as compared with the wooden cars of the same general type and capacity.

In Table No. 2 is given a comparison between some typical wooden coaches with three of the all-steel design of coaches, and this comparison shows quite favorably for the steel car when the column giving weight per passenger is considered, and this is the only true basis for consideration. It is possible that still better results may be obtained in the future without the sacrificing of strength.

TABLE NO. 2.

Class or No.	Road	Material	Length Over Body Feet	Seat Capacity	Weight	Weight per Passenger	Weight per Foot
290-295....	Lehigh Valley...	Wood	70	77	118,000	1,530	1,685.7
1015-51....	Frisco.....	"	70	80	106,200	1,327	1,517.1
P. L.....	Pennsylvania....	"	70	80	106,000	1,325	1,514.3
1st Class...	N. Y. C. Lines...	"	61	76	92,800	1,221	1,521.3
P. K.....	Pennsylvania....	"	53.75	62	85,000	1,373	1,581.5
Average ..	.....	.....	64.95	75	101,600	1,355.4	1,563.9
P-70.....	Pennsylvania....	Steel	70.75	88	116,100*	1,319	1,652.6
Coach.....	Southern Pacific.	"	60	70	107,000†	1,528	2,546.6
Coach.....	Union Pacific....	"	68	78	89,300†	1,145	1,313.2
Average ..	.....	.....	66.25	78.6	104,133	1,330.6	1,837.046

*Includes storage batteries. †Includes storage batteries and axle generator.

The life of steel passenger cars is yet to be determined, but judging from experience obtained abroad with steel underframes in passenger cars, which, as stated before, have been in use for some 40 to 50 years, and some of which have been in service for 25 to 30 years, as well as from the experience already obtained in this country with steel freight cars, some of which were placed in service as early as 1884 and are still in service, it would seem that a carefully designed and con-

structed steel passenger car, in which the tendency toward loose rivets will be reduced to a minimum, should last a great number of years, depending upon how long a structure of this kind can be preserved with paint and other means of preventing corrosion. It is generally supposed that passenger cars of steel will receive better attention than freight cars, at least such has been the experience with the wooden car equipment. The rivet work is, however, a feature which should receive special attention, for if the construction is such as to permit vibration or deflection, producing undue stresses not anticipated or provided for, trouble may be expected.

It is also felt that the rivet heads should not be considered as an objection when used in the exterior finish of the car, as they may be neatly arranged with respect to size of heads, location, etc., and, further, to countersink the rivets is objectionable in thin plates on account of decreased strength and liability to work loose; but, on the other hand, rivet heads have been found, in European practice at least, to gather around them a great deal of dirt, difficult to remove and maintain a good appearance on the exterior of the car. It would therefore be for the designer, as well as to the users of cars, to decide as to which is the most preferable. European practice seems to favor the use of the countersunk heads where practicable, and the ordinary rivet heads where less objectionable to the finish of the car and where they can not be successfully avoided without increasing the material or other complications.

Mechanical officers of railroads differ greatly at present as to the best methods in design for overcoming the objectionable features of the wooden passenger cars. Varying local conditions existing on roads on which steel cars have been put in service also had much to do with the widely different forms of design and construction that have so far been made use of in this country.

In a general way, however, the steel equipment already in service can be identified under one of three forms:

(1) Cars with steel underframing and wooden superstructure somewhat similar to the methods employed in modern steel freight car construction in which the underframing is of steel.

(2) Cars with steel underframing and steel upperframing, such as posts, braces and carlines; the rest of the material being of wood, or part fireproof material; or, in other words, a "composite" car with perhaps steel on the outside in place of wooden sidings.

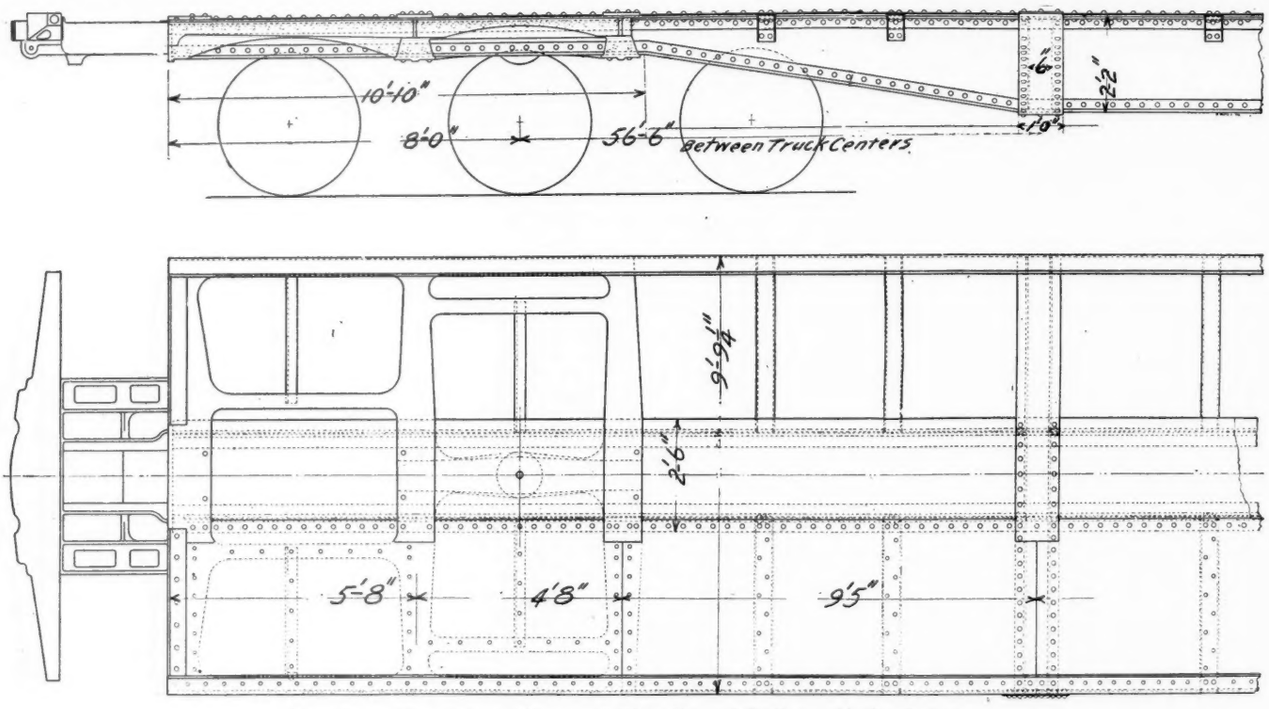
(3) All-steel cars—that is cars made up of steel or metal throughout, with the possible exception of small quantities of wood and fireproof material for filling blocks, insulation and interior finish, such as mouldings, etc.

Table No. 3 gives a list of cars already built, or under construction, most of which have been referred to in this report. This table also gives the general forms of construction, weights, etc., together with the approximate order in which the cars were completed or are expected to be in service. In making comparisons between the different types of cars, the weight of storage batteries, generators, etc., which may be used on some cars and not on others, should be taken into consideration.

A summary of the foregoing will show that the steel car equipment for steam railroads now in service or under construction, and coming within the scope of this report, is composed of about 380 units. Nine railroads and four or five car companies figure more or less in the operation and production of these cars. The greatest development is shown in the East, which is no doubt stimulated by the many tunnels in and around New York through which the cars of steam railroads will pass, and in the construction of which cars steel and fireproof material is considered to be essential in order to insure safety.

Standard Sectional Area.

There appears to be a considerable difference of opinion among railroad men today as to what end shocks and stresses should be anticipated in the construction of the car. This may be due in a measure to a lack of reliable information on just



Steel Passenger Cars—Plan and Elevation of Pullman Under-frame.

what occurs in collision; but the varying length of train, difference in speeds, and other operating conditions are also elements which go to control.

There is also a difference in ideas among designers as to how the stresses in a car had best be met, so that from this, together with the foregoing, new cars are being constructed along entirely different lines. These different designs, however, may be divided into three types:

(1) That in which the load, car body and lading is carried by side girders, an additional girder being provided through the center of the car for the pulling and buffing strains. An illustration of this class is the New York Central motor car.

(2) That in which the load, car body and lading is carried by the center girder, which at the same time takes care of the pulling and buffing strains. Under this class would come the Pennsylvania Railroad car.

(3) That in which the center and side rails with truss rods and the general construction of wooden cars is reproduced in metal. The Southern Pacific car may be given as an example of this class.

These types of course can, and they do, exist somewhat in combination, an example of such combinations being the Erie and Southern cars, where a portion of the load of the car body and lading reaches the trucks through cantilevers and the center sills, while another portion is transferred to the trucks from the sides of the car through the bolsters. The center

sills, therefore, resist the end shocks and assist in carrying the load.

The type also influences the weight, but to what extent the disadvantage of increased weight with any one type is offset by other disadvantages of some other type has yet to be determined. The argument in favor of each has been presented earlier in the report.

The center sill area of the cars given for illustration is as follows: For the first class 10.66 square inches; for the second, 50 square inches, and for the third 18.52 square inches.

As will be observed, these areas differ widely, but it is not at all probable that the cars were designed for the same end shock. However, had this been the case, from a careful study of the conditions it is plain that the areas would still have differed; so that from this and so long as cars of these different types are built it is not considered practical to recommend a uniform section of center sill, nor a standard sectional area, as on the disposition of metal in a section largely depends its value.

In addition, before this could consistently be done it would be necessary to standardize the different lengths of passenger equipment cars, and if the three types of construction are to be perpetuated, dispose of the question of straight versus fish-belly center sills and the provision of side doors—in short, the framing of the car almost as a whole.

It is possible, however, to adhere to limiting conditions so that with the use of rational methods of calculation we can accomplish closely the same purpose.

For freight cars it has been the practice for some roads to assume that a car must withstand end shocks equivalent to 300,000 pounds compression whenever, the car is shifted, and such shocks are often equivalent to 500,000 pounds. The center sill construction of these cars has been such as to enable it to resist this shock without exceeding the elastic limit of the metal, and from the past five years' experience it is believed that this basis is none too high.

According to report of tests made on the Lake Shore & Michigan Southern in 1902, the buffing stresses ran frequently over 300,000 pounds, and the indications were that draft gears and underframes should be capable of withstanding pulling stresses of 150,000 pounds, and buffing stresses of 500,000 pounds. The dynamometer car, in being shunted against a loaded 60,000-pound furniture car at 33¼ miles per hour, gave a record of 381,700 pounds, the capacity of the recording apparatus, and what the actual shock was is not known. From tests made on the Pennsylvania Lines West a dynamometer car weighing 51,000 pounds was allowed to descend a grade at seven miles per hour, from which a shock of 607,000 pounds (the capacity of the machine) was recorded. A loaded steel freight car and the dynamometer car, weight 181,400 pounds, striking another car at 3.9 miles per hour, caused a shock of 400,000 pounds. It is true that these tests were made with freight equipment and under abnormal conditions, but as the cars in all classes of steam service come together and are coupled at speeds equal to, or in excess of those mentioned, it would not be safe to assume end shocks of less than 400,000 pounds.

In collisions between passenger and freight cars the passenger cars should not be seriously damaged, which requires the passenger car center sill construction to be at least as strong as that of the strongest freight cars. For passenger cars it is advisable to use a higher factor of safety, therefore the center sill construction in passenger equipment cars used in through trains should be capable of withstanding a shock of 150,000 pounds on the draft gear and 250,000 pounds on the buffers, making a total of 400,000 pounds compression, in which the combined stresses should be 12,500 pounds per square inch, and in no case exceed 15,000 pounds per square inch. For cars used strictly in suburban service—in comparatively short trains with coaches of the same size—the fiber stress might be increased to 20,000 pounds, but this figure should not be exceeded.

Upper Decks Versus Semi-Elliptical Roofs.

As there is such a radical difference of opinion in the committee as to the relative merits of steel passenger cars with upper decks, and those with semi-elliptical section without upper deck, it seems wise and proper to place before the association the claims of the advocates of each type of roof. For purposes of discussion the subject naturally resolves itself into: (1) relative strength; (2) relative safety; (3) appearances—inside and out; (4) cost and economy; (5) ventilation.

By consultation, a marked difference of opinion of prominent railroad mechanical men and designing engineers has been devoloped. Some have criticized the semi-elliptical roof, on account of the lack of ventilation and inartistic appearance. One has stated that the semi-elliptical roof reminds him of an old style prairie or Conestoga wagon (prairie schooner), and as a backward step. Others are strongly in favor of this departure from the upper deck, on account of claimed superior strength, appearance, cheapness and economy of construction, and more particularly on account of its claim for having superior ventilating facilities.

The advocates of the semi-elliptical roof argue that the relative strength of such a roof, as compared with a multi-angular double-deck roof, is apparently conclusive as to the superior strength of the semi-elliptical roof. The double-deck roof is composed of six sharp angles—six points where there is practically no elasticity whatever—which is weakening to the structure itself. In addition, at each one of these angles is a joint, a conjunction of parts, an inherent weakness of design.

With the heavier equipment, steel or iron carlines have been introduced to reënforce the wood; but these steel carlines unsupported are extremely fragile, and frequently lose their shape and are often damaged in handling before same can be applied to the cars.

In constructing a new passenger coach, the roof of the car, as generally built, has to be supported from the floor by posts until the sheathing and lining are complete, so as to make it self-sustaining. In the semi-elliptical roof, the posts and carlines are, as a rule, made as one steel unit with no joints; this, it is claimed, is of much lighter construction than any wood or combination material ordinarily used in the double-deck type of roof, and extends from one side sill up over the roof and down, joining into the other sill, forming one of the strongest shapes known—self-supporting from the time it is fastened to the side sill, each member reënforcing and adding strength to its additional members; the efficiency and strength of such designs seems obvious to its advocates.

The adherents of the upper-deck type of roof contend that the claims for superior strength in the semi-elliptical roof are based more on theory than any practical proof. It is believed that the style of roof carline used with the upper deck can be made in every way as strong as for the carline for a semi-elliptic roof, having the same depth of roof from eaves to crown, or at least practically as strong and without any undue increase in weight. The claim that a roof of semi-elliptical shape is practically non-collapsible, if the car is turned over in a wreck is questioned by its opponents. It is interesting to note that in recent construction on British and Europe railways the upper-deck type of roof is rapidly superseding the semi-elliptical type wherever the restrictions of tunnels will permit the change. This would indicate that the roads who have longest used semi-elliptical roofs find them less satisfactory than the American upper-deck roof. Some members of the association are familiar with a large number of passenger cars in the East constructed without any heavy upper-deck sills or plates, but every carline was a through carline so constructed as to be practically free from any weak corners or joints. Decks made in this manner were over 1,000 pounds lighter than the regulation upper deck, and though lighter, much stronger and has less tendency to spread. If an ordinary upper-deck section is framed in like manner to the semi-elliptic roof it is claimed possible to have all the advantages of the upper deck combined with any possible advantages of the semi-elliptic form.

The advocates of semi-elliptical roofs claim that in case of derailment, the sides of the car are held together with a double-deck roof by such a weak construction, that the superstructure is most generally distorted out of shape, frequently going to pieces entirely; and, in cases where cars turn over, the roof frequently collapses, the car frame is always racked to such an extent that it has to be rebuilt. The superiority of the semi-elliptical roof, with its unit post and carlines, and its reënforcing properties, seems to them self-apparent; and the liability of disrupting a structure of this kind is immensely decreased.

They argue further that the roof of a car, like the roof of a house, is not particularly an attractive feature from the outside. It has no bright colors, nor any lines that tend to make it attractive. While the semi-elliptical roof is a novelty, it may attract attention; the curves and lines of this roof are certainly as attractive as the ordinary double-deck roof, but this point of outside appearance seems insignificant.

These claims for greater safety of the semi-elliptical roof are denied by the other side as being only theoretical and far fetched and incapable of proof.

It is remembered by some members of the association that about twenty years ago a considerable number of coaches and sleeping cars were constructed with what is known as the "Mann" roof. Several of these cars were in wrecks, and where overturned there never was any marked superiority shown as to strength to resist punishment in the cars having these strongly constructed "Mann" semi-elliptical roofs. One important objection to the semi-elliptical form is that in order to meet clearance dimensions of many eastern tunnels the in-

side clear height would have to be considerably reduced, with marked objections to such a contraction in inside height.

The friends of the semi-elliptical roof state that in the interior of passenger equipment, the tendency has been toward the elimination of straight lines and angles, and to gradually approach the semi-elliptical shape; that the upper deck of most of our cars has been rounded, making a segment of a circle. The semi-elliptical roof, having the appearance of a regular well-defined arch, is novel; but with its increased possibilities of decoration they believe the appearance of a semi-elliptical roof would seem to have many advantages over the double deck.

The opponents of semi-elliptical section consider, for general adoption in the East, at least, that the necessary reduction of height to suit clearance requirements of tunnels would materially detract from the roomy appearance of cars so designed, and they point to the photographs of interiors of such cars. They refer to the less roomy appearance of the large number of European cars, which have semi-elliptical roofs. They refer also to the considerable number of Mann roof cars built formerly for New England roads, which were found noisy and generally objectionable by patrons of the roads, so much so that the use of such designs was abandoned after a few years.

It is claimed by some that the first cost of the double-deck roof is necessarily greater than the semi-elliptical, and its maintenance the same. That with the double-deck roof, the expensive fitting of deck sash, the expensive repairs necessary to the fastenings, weather stripping, etc., replacement of lights, and the flashing of roof, unquestionably means more expensive cost of maintenance.

With the semi-elliptical roof, it is claimed that the continuous head-lining from one side to the other, the continuous roof from one side to the other, on the outside, plain surfaces, the lack of corners to crack, the lack of crevices to hold dust, dirt and moisture, the complete protection from water and its consequential damaging effects, are all indicative of the low cost of maintenance.

The upper-deck advocates concede that there may be a slight difference in first cost and in maintenance, but that the advantages to the passenger more than compensates the railroad, and warrants it in expending the slight additional amount.

The claims for superiority in ventilation with the semi-elliptical roof are argued as follows:

The idea of the deck sash expelling the foul air from the interior of the car and at the same time providing an intake for fresh air—in other words, performing two purposes diametrically opposed to each other, is, on the face of it, illogical and unreasonable.

With the deck-sash ventilation, the same is entirely dependent for its movement upon the difference in temperatures of the fresh and foul air—in other words, upon the gravity system; and in a railway coach, moving from 40 to 60 miles per hour, the air currents incident to the movement of the train through the air, and the consequential air pressures, are so great in their influence, as compared with this movement of air incident to the gravity force, that the latter is almost entirely overcome.

The impossibilities of regulating the temperatures of the ordinary passenger equipment to the satisfaction of the general public, is unquestionably partially the result, if not largely the result, of improper ventilation—insufficient supply of oxygen for the human lungs. Thus, this insufficient supply of fresh air produces physiological results upon the human system of respiration, and that, in turn, causing discomforts apparently from heat to cold. Some are too hot, while others are too cold. Experiments have shown that with a well ventilated car the temperature inside could be varied from 66 to 74 degrees without the slightest interference with the comforts of the passengers.

Furthermore, there are a great many thousand double-deck passenger cars in service, and there have been a great many experiments and a great many able men have devoted their energies to perfecting a ventilating system for this style of equipment, but without any practical success up to the present time.

The greatest success in the ventilating of the double-deck passenger equipment has been obtained by one large railroad system and one large private car builder, by the use of exhaust or suction ventilators in the roof, with the deck sash tightly sealed; thus, in obtaining improved ventilation, one of the first steps in the development is to tightly close and put out of use the deck sash.

The poor ventilation obtained from the gravity system, or from deck sash, being inadequate for the present requirements, a mechanical system of ventilation seems imperative. This, therefore, is obtained by the location of suction ventilators pulling out the foul air from the top of the car, and suitable intakes furnishing fresh supply of air at the floor line of the car.

The semi-elliptical roof, therefore, with the improved methods of ventilation, is just as effective—and it is claimed more so, than the ordinary double-deck roof.

The users and advocates of upper-deck roofs feel assured that no claim for advantages in ventilation can be claimed for the semi-elliptical roof and that this has been extensively proven by the large number of coaches and sleepers heretofore built with the long since abandoned Mann roof. They further point to the fact that European roads are rapidly adopting the American upper-deck roofs on account of the well-recognized superior ventilation possibilities. It is argued that any improved system of ventilation is equally effective and generally more easily applied on cars having upper decks.

The introduction of steel in place of wood, for passenger equipment, from present indications, is a foregone conclusion. Yet it seems reasonable—in fact, it almost seems imperative—that with the introduction of steel for building passenger equipment, the design of car should be so modified, and the frame so constructed as to utilize to the maximum extent all the structural properties of the steel material.

It is evident that the forms and designs adopted to utilize wood to the best advantage do not necessarily apply to metal. Therefore, it would seem not unwise that efforts should be exerted to develop a car of the maximum efficiency, independent of stereotyped forms of construction, developed by practice and usage in wooden cars.

The principal arguments for and against the present generally adopted form of upper-deck roofs on American railroad cars are so directly contradictory and at variance that your committee deems it difficult and unwise to attempt to draw conclusions and so content themselves with laying the arguments thus fully before the Association, leaving it for time and public sentiment to bring about the survival of the fittest.

Best Construction of Flooring.

While a vast amount of experience has been gained in the use of various materials as floor coverings in buildings, etc., wood alone with some textural covering has been used to the greatest extent in passenger car work.

Under the modern conditions of car design, the first consideration is the safety of the people carried.

Thus it is that a metal or metal and composite construction should be used for floors, particularly in cars of steel design, to eliminate, as far as possible, injury done by wheels or parts of trucks or any outside substance punching through same in case of an accident.

A great many kinds of material have been suggested; still for safety there are good arguments for starting with a steel floor of some considerable thickness.

Many of the designers and builders to-day are using nothing but a plain or special corrugated steel or iron sheet extending from side to side of car. This, of course, affords but very little protection from outside interference in case of wreck. To this corrugated steel floor a plastic floor is applied, mostly composed of sawdust and magnesia cement.

Coverings called under various trade names, such as Monolith, Karbolith, Asbestolith, Acondolith, Flexolith and other mortarlike combinations of asbestos and cement, have been used in combination with steel plates, wire netting and rolled shapes.

The requirements for maximum insulative properties against sound and heat are probably met in most of these products equally well. These, however, are requirements that are most essential in passenger car work and too much stress can not be laid upon them. It is expected, however, that their surfaces should be impervious to hot or cold water, and be frequently flushed and cleaned without deterioration of the material constituting the floor.

Your committee does not believe that it is within its province to recommend a standard floor construction, but suggests that the floor construction of a steel passenger car should embody elements to obtain the following results:

1. Fireproof surfaces—outside and inside.
2. Resistance against loose brake gear, wheels, etc.
3. Resistance against transverse and diagonal strains.
4. Resistance against breakage from vibration.
5. Non-conductor of heat.
6. Minimum of weight.
7. Non-conductor of sound.
8. Satisfactory walking and wearing surface.

Sections of various designs of floors are shown in a plate accompanying the report.

Materials for Inside Finish for Fireproof Construction.

There is a great deal of difference of opinion as to how far it is advisable to substitute metal and fireproof construc-

tion for wood, and whether it is advisable or actually necessary (at least on surface railroads) to go to the extreme, or in other words, to eliminate all wood.

Many designers feel that there can be little practical objection to the use of a limited amount of wood—as, for instance, for seat arms, sash mouldings and other interior finish—so long as the use of steel in the underframing and the elimination of a large section of wood in the superstructure, which would be liable to fire, heat and splinter, is provided for. For it is believed that the window glass is just as dangerous, if not more so, to passengers when cars are wrecked as the kind of woodwork referred to above would be. It has been suggested that perhaps it would be a benefit in some cases—as, for instance, in tunnels where the windows are of very little benefit as far as light is concerned and practically nothing may be seen from the windows—that the glass would be made with interwoven metal screens.

The committee considers that, as a general proposition, the most desirable materials for inside finish for steel passenger cars should have the maximum advantages as to durability, non-inflammability, insulating qualities, non-hygroscopic qualities, lightness, neatness of appearance and reasonable initial cost.

It is conceded that the material which meets most of these requirements is light sheet steel. This material is not always feasible for use in all locations. Artificial board, aluminum, and in some cases fireproofed wood or other material, are often better suited for interior finish above the window sills and for the head lining. Aluminum has the advantage of lightness, but it is comparatively expensive.

Interlocking sheet steel sheathing has been recommended for interior finish between floor and window sills.

Brass and copper might be used with good effect, but to most railroads their price is prohibitive.

For moldings, finishing pieces, etc., very serviceable and adequate material may be procured in drawn steel and aluminum.

There are many kinds of artificial boards on the market, more or less fireproof and all hygroscopic with the exception possibly, of Transite. Unfortunately, with most of these the fireproof qualities are in inverse ratio to the hygroscopic qualities. These artificial boards are made up from different bases of asbestos, wood pulp, etc., combined with cement and other ingredients. The artificial materials which have been mostly used are Transite, Durite, Fiberite, Uralite, Vitribestos, Indestructible fiber, Composite board, Service board and Agasote (impermeable mill board).

Samples of each of these are on exhibition with weight per square foot of material ¼-inch thick marked thereon.

Fireproofed wood is not generally recommended for interior finish for the reason that the fireproofing chemicals are apt to exude and spoil the finish, and the process at present is not always permanent. To be properly fireproofed the weight of the wood should be materially increased by reason of the chemical treatment, and these chemicals also corrode any steel, wood screws, nails, etc., which come in contact with them.

One of the most important features for inside finish is insulation against heat and cold. Not only should an air space be provided between inside and outside finish but any metallic substance used for inside finish should be backed up with some non-conductive material. Steel or aluminum plates backed up with Ceilinite, an asbestos cloth, have been tried.

The whole question of material for inside finish from a standpoint of insulation against heat and cold, has not been thoroughly worked out, and is a subject to which manufacturers should give prompt attention, looking toward the speedy production of a serviceable product that is permanently fireproofed.

Conclusion.

The entire subject of steel passenger car construction, as may be seen from the above report, is as yet largely in an experimental state, and it is quite difficult, if not impossible, to draw definite conclusions or give definite recommendations which would be suitable to all conditions. From the determined manner in which the construction of steel passenger cars has been taken up by so many railroads and manufacturing companies during the last few years, further interesting and valuable information will unquestionably be obtained in the very near future. It is to be hoped, however, that an effort will be made toward uniformity in construction and design in order that the most satisfactory results may be obtained.

In 1870 it was stated that the average life of an English locomotive was 350,000 miles of travel. Comparing this with the modern American passenger locomotive, which is capable of traveling 1,500,000 miles during its life, the latter figures show marked progress in the art of locomotive building.

AUTOMATIC CONNECTORS.*

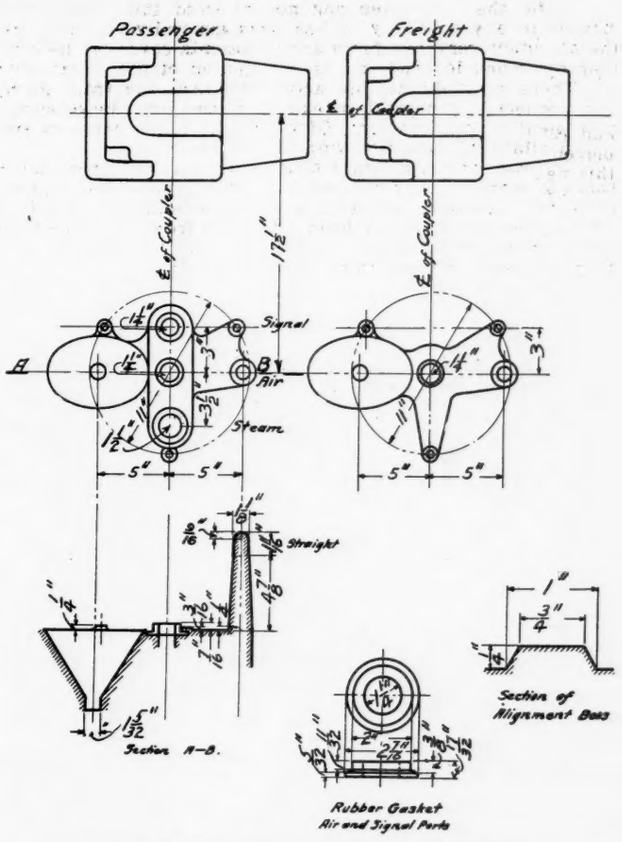
In order to ascertain the present status of the automatic connector, the committee has written to all the manufacturers of automatic connectors that could be found in the United States, asking for full information with reference to their connectors and all points that they thought it desirable to cover.

In the types of connectors referred to in this report, a butting connector is understood to be one in which the contact faces are in a vertical plane at right angles to the track; the side-port connector is one in which the contact faces are in a vertical plane parallel to track.

Four types were found which were perfected to a point that the committee felt it could consider them, one being of the side-port type and three of the butting type.

The collecting and registering devices are principally of two types: (1) pin and funnel; and (2), some form of wings or wing and tongue.

Of the connectors referred to, the side-port connector had a wing and tongue collecting and registering device and two



Automatic Connectors—Recommended Type.

of the butting connectors different forms of wings and one a pin and funnel.

The committee has considered all these carefully and is of the opinion that the pin and funnel, or some modification thereof, seems to offer the best possibilities.

From a careful study of these designs your committee recommends the butting type of connector. That the center line of the air-brake port should be 17½ inches below the center line of the coupler. For passenger car connectors the sequence of ports from the top to be as follows: air signal, air brake and steam heat, to be located on the vertical center line of the coupler. Air-signal and air-brake ports to be spaced 3 inches centers; the center of steam-heat port 3½ inches below center of air-brake port.

There are in a few instances four ports required between passenger cars. The connector is recommended so located that a fourth port can be added above the signal port.

The air-signal and air-brake gaskets to have an opening of 1¼ inches and to be interchangeable. The steam-heat gasket to have an opening 1½ inches in diameter. The regis-

*Abstract of a report presented at the annual convention of the Master Car Builders' Association at Atlantic City, N. J., June, 1908, by a committee consisting of G. C. Bishop, Henry Bartlett, F. M. Gilbert, J. M. Shackford and J. F. DeVoy.

tering device to follow the pin and funnel principle. The gathering range vertically to be not less than 2½ inches above and below the center and horizontally to be not less than 3½ inches to the right and to the left of the center.

The pin and funnel to be located on the horizontal center line of the air-brake port, the center of the pin to be located 5 inches from the center line of the connector on the right-hand side facing it; the center of the funnel 5 inches to the left of the center line. The pin to have a spherical end and to be 6 9-16 inches in length from face of connector, its outer end to be 1⅛ inches in diameter for at least 1 11-16 inches. The hole in the funnel to be 1 5-32 inches in diameter.

Three stops to be located on the face of the connector on a horizontal line 3 inches above the center of the air-brake port and on a circle of 5½ inches radius, whose center corresponds with that of the air-brake port; the bottom stop to be located on the center line of connector 5½ inches below the center line of the air-brake port.

For freight car connectors all but the air-brake port to be omitted, the relation between this port and the collecting and registering devices remaining the same.

While the committee has not referred the question of patents to any authority, it has been generally conceded by the manufacturers that there are no patents covering the contour recommended and this is the opinion of the committee.

There must be flexible action between the train pipes and connector somewhat in excess of the total longitudinal movement of the coupler. Of course, it it desirable to get this flexibility, if possible, without the use of hose.

The committee, in order to give the manufacturers some basis to work on, has recommended dimensions and suggestions for a contour, but wishes to call attention to the fact that suggestions have not been developed from a service test, and therefore recommends that the association arrange for a thorough trial of connectors on these lines.

AIR-BRAKE HOSE SPECIFICATIONS.*

In 1906 your committee made recommendation that a chemical test be incorporated in the specifications for air-brake hose. It has been found, however, that this is not practicable and we therefore withdraw this recommendation.

As the wrapped air-brake hose specifications are now the standard and the woven and combination woven and wrapped specifications are recommended practice, your committee has recommended to the committee on "Standards and Recommended Practices" that the specifications which are now recommended practice for woven and combination wrapped and woven air-brake hose be advanced to a standard of the association.

The rules which go into effect on September 1, 1908, require the use of standard hose, and unless tne specifications for woven and combination wrapped and woven hose be advanced to a standard together with the wrapped hose, the use of this type of hose will not be permitted.

It has been brought to the attention of your committee that, on account of the damage continually done to the nipple end of hose, possibly hose built up by reinforcement or protection at the ends may prove an effective and economical proposition. While your committee has given consideration to this it is not yet in a position to make more definite recommendation than to emphasize the necessity of maintaining the present specifications another year.

Your committee, in view of this possibility, asks to be continued, that it may make further investigation of the possibilities of this question.

The following extract from "Niles' Register" for May 15, 1830, gives an account of the first American experiment in railroading: "The Baltimore & Ohio Railroad will be traveled in wagons, 13 miles, to Ellicott's Upper Milles, in a day or two, at the rate of at least 10 miles an hour. Tens of thousands will embrace the opportunity of seeing the noblest work yet attempted in the United States, of traveling 26 miles in two and one-half hours without danger of fatigue, of enjoying the fresh air, of passing through one of the most romantic and beautiful countries we have—every minute presenting something new to be admired by strangers on the road. The wagons will start on different hours in the day, and soon, perhaps hourly. Each wagon drawn by one horse will carry from 25 to 30 persons with entire convenience. The 13 miles will be divided into two stages for a change of horses, which may be effected in about one-half a minute from the excellency of the gearing. The fare will be moderate."

*A report presented at the annual convention of the Master Car Builders' Association at Atlantic City, N. J., June, 1908, by a committee consisting of Le Grand Parish, J. Milliken, R. W. Burnett, J. A. Carney and R. F. Kilpatrick.

With Exhibitors and Others

The American Locomotive Company, New York, is represented by H. F. Ball, G. M. Basford and A. Haller. J. D. Sawyer and David Van Alstyne are expected to arrive on Saturday.

* * *

Phœbe Snow keeps clean on the road of anthracite, while everyone is kept clean on any road if the cars are equipped with the Brown metallic window strip. This device is made by the Metal Plated Car & Lumber Company.

* * *

The Commonwealth Steel Company of St. Louis has on display at the Philadelphia & Reading exhibition yards at Mississippi avenue and the Boardwalk a cast steel tender frame made in one piece. At its booth on the pier this company has, among other interesting things, models of the transom draft gear and cast steel bumper beam, the Davis counterbalance driving wheel and tiregraph, the Adams boltless engine and tender trucks, four and six-wheel passenger trucks, and the Commonwealth gasoline railroad weed burner. Some fine tests of unannealed basic open-hearth cast steel are shown, one cutting being 40 feet long without a break and one bar being twisted eight times before fracture. A boltless carrier iron for all classes of car equipment is shown. One of these can be seen applied to the cast steel tender frame referred to above.

* * *

The central feature of the General Railway Supply Company's exhibit at spaces 161-163, Machinery Hall, is the stub end of a passenger coach fitted up with the various devices handled by the company. These include "Metallic (Steel) Sheathing" on the exterior and "Metallic (Steel) Lining inside," National steel trap doors and lifting device, Schroyer friction curtain rollers and fixtures, Garland ventilators, Flexolith composition flooring, National standard roofing, National automatic vestibule curtain catches, and Ideal roller center bearings. The company is ably represented by H. U. Morton, vice-president.

* * *

The representatives of the Hunt-Spiller Manufacturing Corporation, W. B. Leach and John G. Platt, were both brought up in the mechanical departments of railroads and in their railroad experience used Hunt-Spiller gun iron and knew of its good qualities. They have, therefore, been particularly well fitted to interest others and can from practical experience, tell of the money to be saved and service to be obtained from its use in cylinder packing, cylinder bushings, driving boxes, and other locomotive castings.

* * *

The Hanlon Locomotive Sander Company, of Winchester, Mass., secured the order for 131 of the 136 new locomotives building for the New York Central.

* * *

J. H. Kent and J. T. Stafford, representing Edwin R. Kent & Co., Inc., of Chicago and New York, are entertaining the company's friends at room 607, Traymore Hotel. Incidentally they are explaining the merits of the company's products, which include Allen's (stag) manganese steam and street railroad frogs, crossings, switch points, rails, crusher jaws, corrugated shells, sprocket wheels, tramway points, etc., also the well-known brands of Allen's air-hardening high-speed and carbon steels, chucks, and flat and twist high speed drills. This well-known firm, which has thousands of customers using its tool steels with the best results obtainable, has entered into the manufacture of manganese steel castings with characteristic energy. They make a guarantee on railroad frogs and crossings of eight to one against built-up Bessemer steel

frogs and crossings. Records in the Chicago office show that solid cast frogs and crossings have been in service for over one year without any perceptible wear whatever on some of the largest railroads in the United States and Europe. Photographs, blue prints and models are on display at the Traymore.

* * *

Edwin R. Kent & Co., tool steel manufacturers of Allen steel, are located at 607 Traymore hotel, where all friends, both new and old, are welcome. The company is represented by Edwin R. Kent, J. H. Kent, J. T. Stafford and Thos. Hampton.

* * *

The Excel coupler on view at the exhibit of the Scullin-Gallagher Iron & Steel Company has a positive coupling action, positive lock set, positive knuckle opener, closed throat and underlift pin. An important feature is the absence of a pivot pin, the knuckle being operated on trunnions having hardened steel inserts. The wearing surfaces in the Excel coupler are broad, in order to reduce wear to a minimum and provide against the abrasion of the parts in contact when under pulling stresses.

* * *

The exhibit of the Storrs Mica Company, of Owego, N. Y., shows a number of small incandescent gas lights all equipped with little mica chimneys. These small chimneys, less than one and a half inches in diameter, are necessarily very near the intense heat of the mantle, and they thus illustrate forcibly the heat-resisting quality of the mica, which is the foundation of its durability and economy as a material for headlight chimneys.

* * *

The Canadian Pacific is equipped from coast to coast with Zenoleum disinfecting machines made by the Zenner Disinfectant Company, of Detroit, Mich., which indicates the efficiency of this device for use in coaches making long runs.

* * *

Among the many devices for assuring travel luxury, there are none more highly appreciated than those pertaining to car window locks, shades and fixtures. Noiseless and weather-proof window sash holders, fittings, curtains and fixtures that fulfill their mission without provoking complaint are conveniences the riding public has most to deal with, and the National Lock Washer Company, of Newark, N. J., invites those interested in such equipment to visit its exhibit.

* * *

It has been found that by the use of properly designed regulators in passenger cars the train pipe pressure may be considerably reduced and a more even temperature maintained in the cars, resulting in economy of steam and reduced wear and tear on the hose. Tests made with Gold's temperature regulator have borne out this.

* * *

President C. W. Armbrust, of the Love Brake Shoe Company, Chicago, has installed in space 579 one of the most attractive exhibits on the pier. The attention of the master car builders is called to some new features in the Armbrust brake shoes.

* * *

The Falls Hollow Staybolt Company received an order last week from the Great Southern Railroad of Spain, for a car load of Falls Hollow charcoal iron staybolt bars.

Trenton Hopper Door Type "z", the Johnson patent hopper door, made by the Trenton Mallable Iron Co., Trenton, N. J., has an operating mechanism which is novel and operated by a shaft outside of the car or hopper, without a chain. Its operation is positive, being locked automatically, not depending on the pawl and ratchet, as is the case with all chain operated doors, to hold the doors closed. A crank shaft operates a rack and pinion that rotates the angle crank to which links from the doors are connected. These links, by folding up on the angle crank, make short lever arms and require little force to operate the doors. The crank arm of the operating shaft, to which the rack is connected, passes beyond the center to a rest and locks automatically. This door operating mechanism is simple, efficient, positive and easily operated. It is durable, having no chains to break or give trouble.

* * *

The Parkesburg Iron Company, Parkesburg, Pa., has on exhibition a bloom of high grade knobbled charcoal hammered iron, which represents the art of shingling charcoal iron to a high state of perfection. Several fine specimen test pieces of skelp for boiler tubing are shown. These specimens illustrate the high grade of a metal easily bent cold.

* * *

American Nut & Bolt Fastener Company, Pittsburg, Pa., manufacturer of the Bartley fasteners, has recently moved into its new shop at Ontario and Sterling streets. The building is 80 by 215 feet, and is equipped with improved machinery that will insure an annual capacity of 60,000,000 nut and bolt fasteners, including 700 different styles of the Bartley fastener. The company states that during 1907 its shipments amounted to over 15,000,000 nut and bolt fasteners, which were made to nearly every railway and car builder in the United States.

* * *

The T. H. Symington Company's ability to manufacture malleable iron journal boxes and a general line of malleable castings of unexcelled quality and finish is well demonstrated at this convention by its very attracive exhibit. The malleable iron journal boxes shown are for M. C. B. arch bar trucks, and are offered to meet the demand of those railroads who have a preference for journal boxes of this material for heavy freight service. Some of these boxes are equipped with the now well known Symington torsion-spring lid, and others with the company's improved M. C. B. malleable iron lid. Among the general line of malleable iron car castings shown are the following: Brake lever, brake lever coupling bar, brake ratchet wheel, truck column, bolster spring cap, stake pocket.

* * *

The Parkesburg Iron Company, Parkesburg, Pa., is represented in force at the convention, being prepared to converse on the advantages of charcoal iron boiler tubes or to speed friends to the limit with several motor cars.

* * *

An attractive feature of the Chicago Railway Equipment Company's exhibit is the arrangement of several representative Creco brake beams about the desk at the center of the booth. These beams are said by the manufacturers to represent the development of 20 years of brakebeam experience and to combine to a degree heretofore unobtainable light weight, strength, economy and general efficiency. Figures showing weights and results of tests are painted on the beams noted.

* * *

A high standard of purity is claimed for the "Silver Flake" graphite lubricants of the Otley Manufacturing Company, Chicago. The No. 1 large flake is guaranteed to contain 90 per cent of pure carbon. When used on journal bearings with lubricating oil it is stated that it covers the surface evenly and regularly, and being of a pasty consistency, there is no loss while the locomotive is in motion, as with oil alone. A sample will be sent free on application.

* * *

As all the mechanical world knows there are several types of regrinding valves. One well worth while is being shown by the National Tube Company at booths No. 400-402. The peculiar adaptability of this to railroad service is explained by the gentlemen in charge. This type of regrinding valve is being ordered in lots of two and three thousand by large railroad systems.

COMPOUND STEAM MOTOR CAR FOR THE CHICAGO ROCK ISLAND & PACIFIC.

The Schenectady Works of the American Locomotive Company has recently completed a compound motor car for the Chicago Rock Island & Pacific, the general appearance of which is shown by the accompanying half tone illustration. This car which was designed by the builders presents a number of new and interesting features, one of the principal of which is the design of the boiler.

One of the most difficult problems met with in connection with the design of a steam motor car is to provide a boiler of sufficient capacity within the necessarily limited space available. In this design the difficulties have been very satisfactorily met by using a horizontal boiler of the return tube type. The boiler, which is located in the engine room at the forward end of the car, is 95 1-16 inches long over all. The firebox and smokebox are at the front end, and the gases of combustion pass through the fire tubes to the intermediate smokebox chamber at the other or back end of the boiler, and thence forward through the return tubes to the smokebox.

The boiler contains 214 fire tubes 1¼ inches in diameter and 3 feet 9 inches long and an equal number of return tubes of the same diameter but 3 feet 11½ inches long, which gives a tube heating surface of 527.8 square feet. The total heating surface of the boiler is 624.4 square feet, there being 37.6 square feet in the firebox and 59 square feet in the superheater.

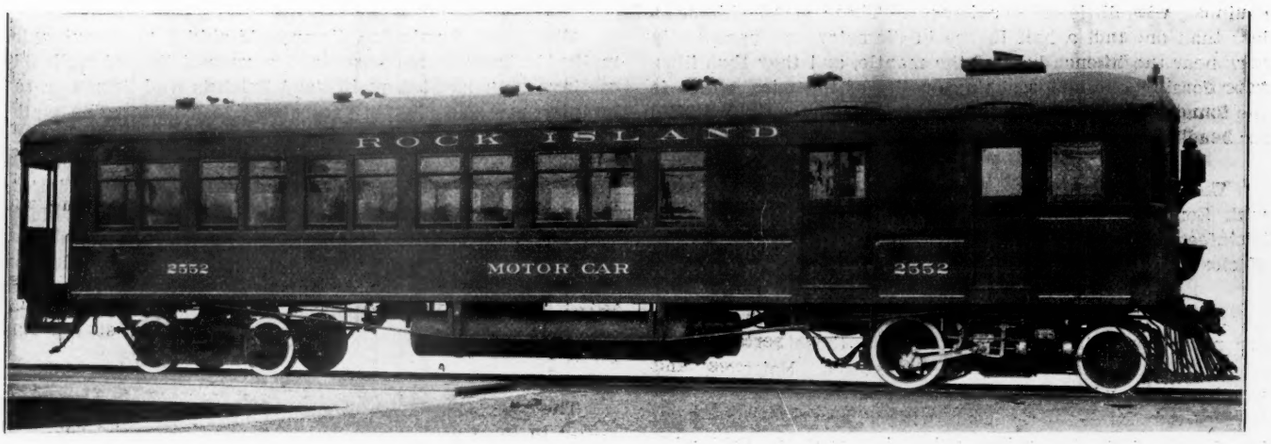
The superheater is the smokebox type and is located in the intermediate smokebox chamber where the temperature of the flue gases is high. The superheater tee-head is bolted to a cast steel saddle casting of box construction which in turn is bolted to the top of the boiler and covers the opening in the sheet through which the superheater tubes extend down into the smokebox chamber. The tee-head is divided transversely into a front and rear compartment. The superheater tubes, which are 16 in number, are bent into the form of a double loop, one end of each loop being connected with the front or saturated steam compartment of the tee-head, and the other with the rear or superheated steam compartment. Steam flows from the dome through a short dry pipe into the saturated steam compartment and from thence through the superheater loops into the superheated compartment, and thence into the high pressure steam chest. The firebox of the boiler is 33⅛ inches long and 43¼ inches wide and is bricked for burning oil, which is used as a fuel.

The boiler is rigidly connected to the motor truck by suitable supports, the floor of the engine room being cut out to provide sufficient clearance for the movement of the boiler when the truck is passing through a curve.

The engine is of the two cylinder cross compound type, the Mellin system of compounding being used. The high pressure cylinder is 9¼ inches in diameter by 12 inches in stroke and the low pressure cylinder is 14½ inches in diameter by the same stroke. The cylinders are equipped with piston valves actuated by Walschaerts valve gear. They drive on the rear wheels only of the truck which are 38 inches in diameter. With a boiler pressure of 250 pounds, the engine will develop a maximum tractive effort, working compound of 4,300 pounds.

The car body, which was built by the American Car & Foundry Company, is of steel construction and is of the combination type, comprising an engine room, baggage room and passenger compartment, having seating capacity for 40 passengers. In order to make the body as light as possible and yet secure a car of great strength the truss rod construction was employed instead of following the usual practice in the construction of steel cars of making the side frames below the window plates in the form of a girder or truss of sufficient strength to carry the whole weight of the car. The side sills consist of steel angles reënforced by truss rods and the center sills are 8-inch I-beams.

The bolster at the trailer end of the car is of the built up type, while that at the motor end is of cast steel made in three sections so that the middle section may be readily removed to permit of the boiler and engine being drawn out from the end of the car in case of any necessary repairs. The middle section of the front end framing of the car body, the flooring ahead of the engine, the coupler casting and pilot are also made removable for the same purpose.



Compound Steam Motor Car for the Rock Island.

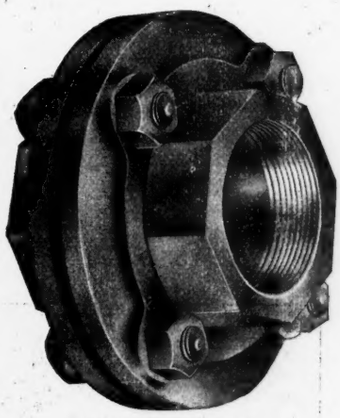
The oil for fuel is carried in a tank having a capacity of 100 gallons located in the engine room. The water supply is carried in two tanks of 300 gallons capacity each suspended beneath the car midway between the trucks. The total weight of the equipment complete, without passenger or freight load, is 100,000 pounds, of which 62,000 pounds is carried on the motor truck and 38,000 pounds on the trailer truck.

This car is now being tested on the experimental track of the New York Central & Hudson River at Schenectady, and the American Locomotive Company extends a cordial invitation to any who are interested to inspect the car, to stop at Schenectady on their return from the convention.

The souvenir paper knife of the National Tube Company is interesting, as it shows a sample of Shelby seamless tubing. This knife is fashioned from a piece of tubing, one-half being cold hammered to form the blade. This forging was done cold but the knife shows neither flaw nor crack. The other souvenirs of the company, which are attractive pocket pieces in various forms and sizes, are also popular.

KEWANEE FLANGE UNION.

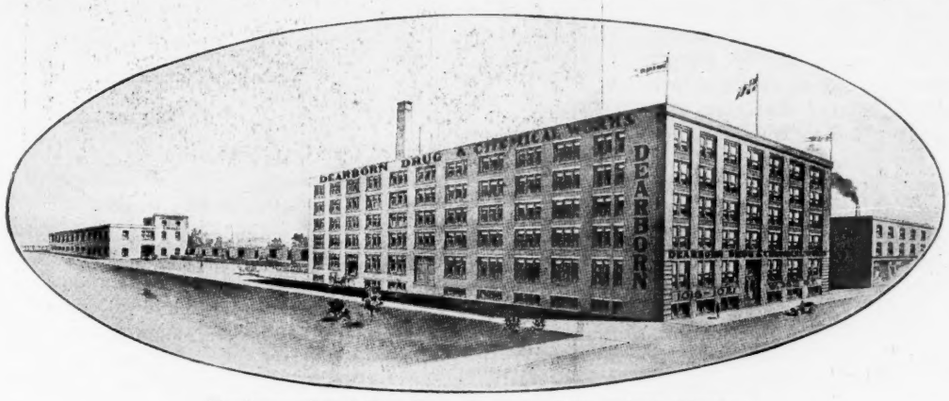
The National Tube Company of Pittsburg requests that every railroad mechanical man who is not satisfied with the type of pipe union he is now using spend a half hour or so at the company's exhibit on the pier, Spaces 400-402, where the Kewanee gasketless union manufactured by this company is on exhibit. The Kewanee union has only three parts, the one end of solid brass, the other end of solid malleable iron, held by the third part, a heavy malleable ring or nut. This combination forms the brass to iron thread connection, which is the patented feature of the Kewanee union, and the brass to iron ball joint which eliminates the need for a gasket. The name Kewanee is in honor of the Kewanee works of the company.



Kewanee Flange Union.

FACTORY OF THE DEARBORN DRUG & CHEMICAL WORKS.

The Dearborn Drug & Chemical Works has recently completed, at 1015-21 West Thirty-fifth street, Chicago, a new manufacturing plant, the building being 100 by 160 feet, and five stories high. The shipping facilities are especially good, the grounds being 660 feet long, with a track from Chicago Junction Railway running the full length of the lot. The plant is equipped with apparatus which has been designed especially by this company for manufacturing the materials which enter into its different water treating preparations.



Factory of the Dearborn Drug and Chemical Works.

The Dearborn company has specialized for 20 years on the treatment of boiler waters. The work was confined almost exclusively to the treatment of waters in stationary plants until about five or six years ago, when it opened its railroad department, and since that time many of the railroad systems of the United States have become regular users of the preparations made by this company, effecting great savings in their mechanical departments by preventing the injurious action of the boiler waters.

The general offices of the Dearborn company are in the Postal Telegraph building, Chicago; the general eastern offices are at No. 299 Broadway, New York, and branch selling offices are maintained in the following cities: Boston, 1101 Oliver building; Buffalo, 302 Morgan building; Cincinnati, 1103 Union Trust building; Cleveland, 1273 West One Hundred and Eleventh street; Denver, 228 Majestic building; El Paso, 312 El Paso and Southwestern building; Detroit, 1309 Majestic building; Havana, Cuba; Honolulu, 42 Queen street; Indianapolis, 1218 Fletcher avenue; Kansas City, 508 New York Life building; Los Angeles, 355 East Second street; Milwaukee, 183 Fourteenth street; Peoria, Ill., Mayer building; Philadelphia, 674 The Bourse; Pittsburg, 1008 House building; St. Louis, 502 Security building; St. Paul, 1237 Lincoln avenue; Salt Lake City, 415 Dooly block; San Francisco, 301 Front street.

BETTENDORF ALL CAST STEEL TRUCK.

The multiplicity of parts used on the old style of arch-bar type of truck has led to the evolution of a truck which would give equally good satisfaction, and at the same time remedy a recognized evil of the old construction. The Bettendorf cast steel side frame, which forms part of the exhibit of the Bettendorf Axle Company, Davenport, Iowa, in booths 224-226-228, is claimed to do four things: it reduces the number of parts per truck from eighty-three to three; it eliminates a rigid channel sand plank, and allows the truck to conform to track curvature, thereby reducing rail and flange wear; lastly, it combines a simple with a strong construction, giving to the car a symmetrical and neat appearance. It is claimed that repairs are reduced, store department stock cut down, and that as an all around doctor for truck evils the "multum in parvo" construction will be found efficient.

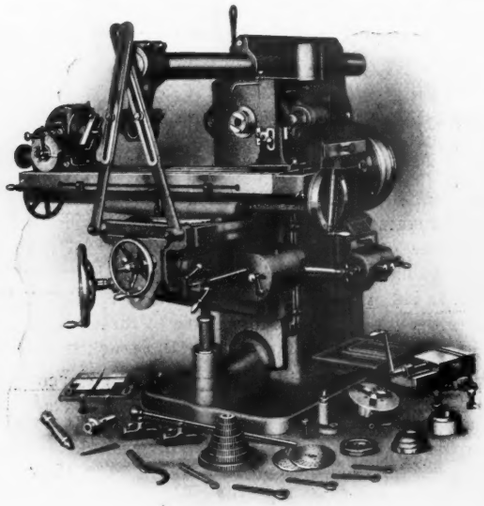
MODERN CAR SEAT COVERINGS.

One of the first ways in which the human being showed his appreciation of a design worked into the plain surface of body material was in the way of patterns cut into or painted upon the materials with which he was most familiar and which lent themselves most readily to his need of the esthetic. Later, when his clothing and his furniture came to be of such nature that the thing was practicable, he substituted patterns in his clothing for tattooing on his skin, and designs worked into the covering of his furniture and his floors for the superficial ornamentation which he had previously given them. The same spirit is still existent, and in a marked degree. Nothing is more simple than a design in cloth, yet everyone occasionally loiters in front of a shop window to study figured fabrics as shown in a variety of colors. The same feeling is turned to advantage in the decoration of car interiors and the covering of car seats. The traveler misses nothing of the beauty or ugliness of a railway coach, though he may not be fully conscious of the sources of his pleasure or displeasure. The manufacturer of car plush first worked up a strong and durable fabric with little thought of beauty. At the present time we have wearing efficiency, with fast attractive colors and artistic designs. The Massachusetts Mohair Plush Company displays, in space 59, a large line of plushes, and the handsomely covered seats invite the wearied visitor to rest.

The U. S. Metal & Manufacturing Company reports excellent success with its Feasible drop brake staff since the last convention. A number of roads in the lumber sections have tried the staff, and find it exceedingly advantageous. Some of the coal roads are adopting it on their drop end gondola cars.

POWER IN DRIVING MILLING MACHINES.

The essential elements in developing power in a milling machine are large belt contact and high belt velocity, and as the adaptation of the constant speed drive permits the use of countershaft and machine pulleys of large diameter, proportioned to take a wide belt and running at a relatively high



Power in Driving Milling Machines—Universal Miller, Constant Speed Drive Type.

constant speed, this meets the demands of the most exacting modern milling machine practice.

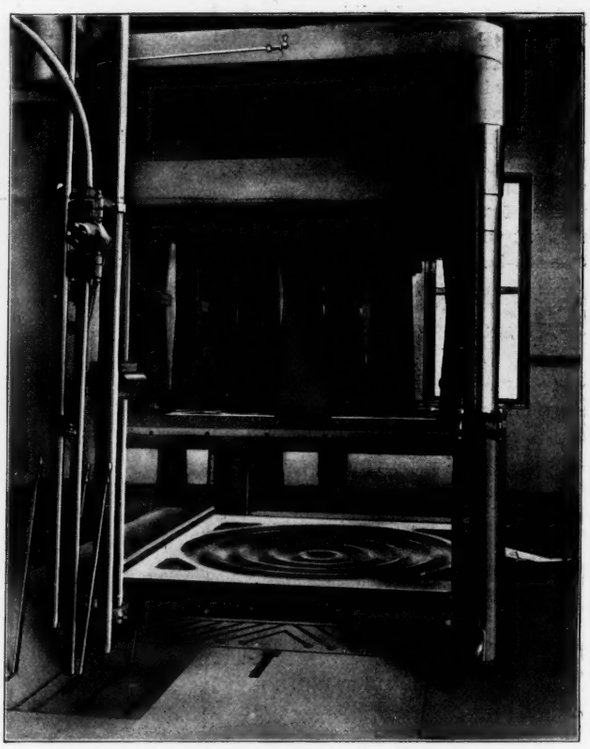
The No. 5B heavy plain milling machine that is being exhibited by the Brown & Sharpe Manufacturing Company is an example of the most modern type of constant speed drive milling machine. The driving pulleys are 20 inches in diameter for a seven-inch belt, which gives an unusually large belt contact, the first element requisite for power. The speed of the machine pulley is 320 revolutions per minute, unusually high for machines of this character, and provides the other element necessary for maximum power efficiency.

Another advantage of this type of drive is constant maximum power available at all times and under all conditions, whether the operator is using a cutter 10 inches in diameter requiring a speed of 14 revolutions per minute or a cutter three and one-half inches diameter, necessitating a speed of 40 revolutions per minute.

The Homestead Valve Manufacturing Company is at present preparing to make the Homestead valve of steel. Many inquiries have been received for a steel valve, and from experiments made at the plants of several large users of valves, the Homestead valve of steel has been found very successful. The Homestead valve is now made of either all brass, of an iron body with brass plug or all iron, or of steel. A booklet describing and giving other information will be gladly supplied upon writing to the Homestead Valve Manufacturing Company at Pittsburg, Pa., or upon asking P. L. Rhodes, who represents this firm at the conventions.

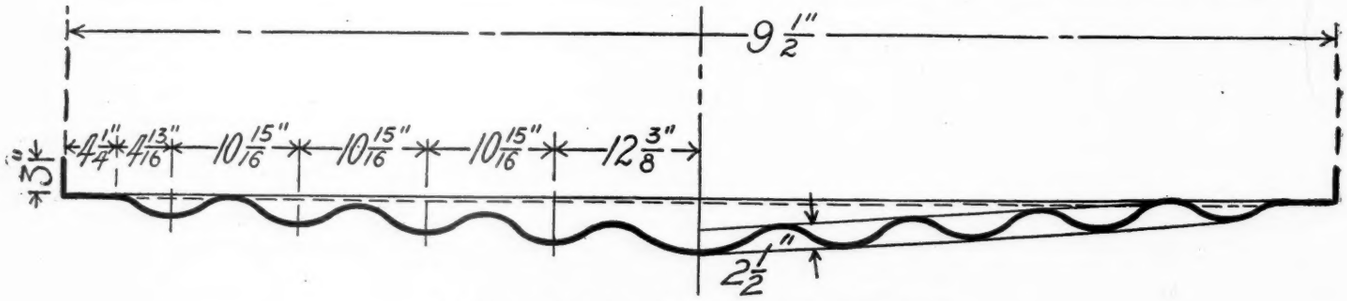
VAN DORN CORRUGATED STEEL END FOR BOX CARS.

Next to the draft sills, the weak point in the construction of box cars is the end framing, and something better than wooden posts is needed in order to make this position approach to some extent the strength and durability of the steel underframe. Complete steel upper frames with thin sheet steel siding have been designed and a few steel box



Van Dorn Steel Car End—Forming Press.

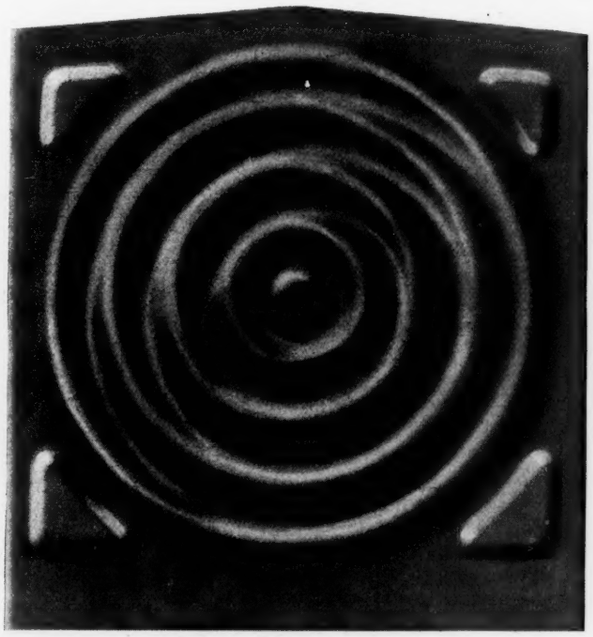
cars have been made built on this general plan, but various objections have been made to such construction, and car builders are not yet ready to adopt such a radical departure from present practice. It is believed, however, by more enterprising motive power officials that a stiff steel end of simple design would be a desirable improvement in overcoming the weakness of wooden construction, and that this is the next step forward which must be made in order to secure a more durable box car.



Van Dorn Steel Car End—Transverse Cross Section.

To provide such an end, W. T. Van Dorn has designed one

which consists of a single steel sheet ¼ inch thick, with deep circular corrugations which extend nearly to the sides, and raised panels in the corners. The sides are provided with flanges four inches deep for attachment to the car siding and the top of the sheet is tapered to correspond with the incline



Van Dorn Steel Car End.

of the roof. A number of these steel end plates were recently pressed hot at the boiler works of John Mohr & Sons, South Chicago. It required a total pressure of 865 tons in the hydraulic press to form the sheet with the deep corrugations, but it was successfully accomplished and the finished plate is smooth and true. The steel end weighs about 1,000 pounds and it provides in a single piece what would in ordinary construction require a number of structural shapes, several sheets and numerous rivets. The corrugated plate is very stiff and should resist a heavier blow in collision, or in shifting load, than any box car end ever constructed.

It is intended also that this form of steel end be used in either wood or steel, baggage, mail and express cars, when no end doors are required.

The new corrugated steel car ends will be manufactured by the W. T. Van Dorn Company, 1074 South Paulina street, Chicago. The company has a sample steel end on exhibit at the convention.

TRUSSED BRAKE BEAMS.

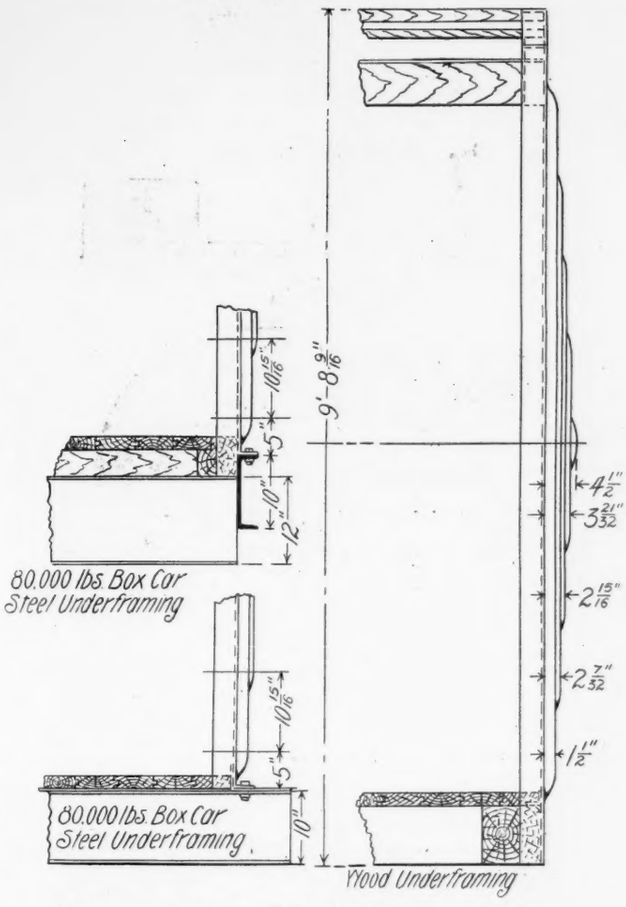
The discussions and action on brake beams at 1906 and 1907 conventions of the M. C. B. association are responsible for a large increase in sales of the trussed type of brake beams. A glance at catalogues of Carnegie, Cambria, Jones & Laughlin and other steel makers will show the maximum stress that eye beams will stand at various loads, and should convince anyone that trussed beams are really necessary to meet new conditions recently imposed by equipment of great capacity. When it is realized that a solid eye beam will stand only about half the stress that a trussed beam of similar weight will carry the reason for the increased demand for the latter type of beam is apparent. The Waycott beam is manufactured in several different weights to meet conditions of both freight and passenger equipment. The compression and tension members being an angle and a tee, stresses from all directions are properly cared for, while the rigid clamping of the fulcrum at center of compression member insures against any movement of the fulcrum in service, and does not interfere with its removal of same without disturbing any other castings on the beam. This beam's advantages are being very thoroughly explained by representatives of the Damascus Brake Beam Company at its exhibit on the pier.

TELEPHONE SERVICE ON THE PIER.

The Delaware & Atlantic Telegraph & Telephone Company has installed nearly 200 telephones on the pier for the especial use of the visiting members. Black enamel sets with 3-lever Baird automatic coin boxes have been used. The cable work throughout the whole job is concealed in order to make a neat appearance. In order to avoid transmission trouble due to dampness, experienced last year, weather proof cords only are employed at every station. To assure good operating a private room has been built to enclose the switchboard. Continuous service is being furnished to 15 stations prominently located on the pier. Each of these is conspicuously labelled, "Night Service."

The Railroad Age Gazette uses the Bell telephone toll line service each day and evening for communicating with the printer in Philadelphia.

Atlantic City now has 5,857 Bell telephones connecting not only all prominent business places and the better class



Van Dorn Steel Car End—Vertical Cross Sections.

of residences, but every room in a large number of the hotels and apartment houses. The number of calls per day rises from its lowest figure in December and January to three times that number in August and at Easter time. The telephone company's equipment, however, is kept sufficiently large to provide for this peak of traffic at all times. From any Bell telephone in Atlantic City conversation may be held with Philadelphia, Harrisburg, Cincinnati or Chicago.

Eighteen millions of messages are sent daily over the

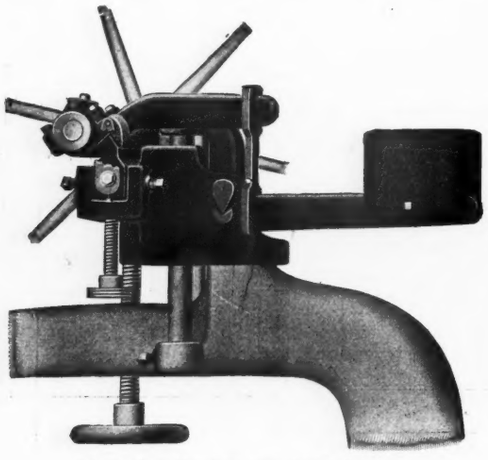
4,000,000 Bell telephones in the United States, these figures being taken from actual counts made on an average day each month throughout the year.

Atlantic City probably is better equipped for telephone service than any other seashore resort; numerous circuits connect it with outside points enabling visitors from all points east of Nebraska to talk with home in a few moments' time for a reasonable charge.

STRAINING DEVICE FOR BAND SAWS.

The accompanying engraving illustrates a very sensitive straining device for band saws which operates on the principle of scales, and is susceptible to the least vibration of the blade. The upper wheel is hung on a knife-edge and counterbalanced with a compound lever. The device is used on the Fay & Egan line of band saws and the device shown here is that used on the company's No. 192 band scroll saw.

Viewing this machine in operation it will be noticed that there is a constant movement up and down of the weight, this showing the quick response of the device to the varying stress on the saw blade as it cuts in lighter or heavier wood. It is found that the device is so sensitive that if a block of wood should fall between the saw blade and the lower wheel it would pass around without injury to the blade. The



Straining Device for Band Saws

sensitive strain adds greatly to the life of the saw blade, and there have been reported cases where a single blade four inches in width has been worn down to less than half its original width without cracking or breaking.

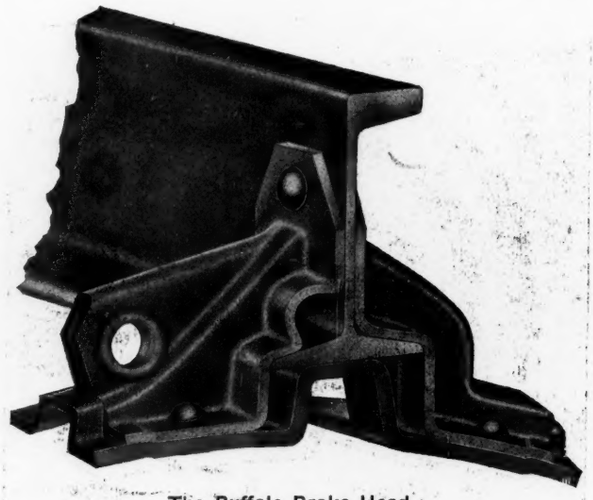
Data in further details may be secured from the manufacturer, the J. A. Fay & Egan Company, Nos. 155-175 W. Front street, Cincinnati, O.

Consolidated Steam Coupler.

A new type of steam coupler with slide gasket and fitted with automatic lock, is being exhibited at the convention by the Consolidated Car-Heating Company. The gasket is extremely simple, being molded in one piece and held is position without the use of springs or other obstruction of the steam passage. It slides into position in a machined groove in the coupler head, and is firmly held in position by simply bending a steel lug on the gasket. The automatic locking device insures a steam tight joint under all conditions, as it brings the gaskets together and locks them as one piece. It locks with foreign couplers, and prevents the coupler heads from lifting and leaking steam on sharp curves or under strain of draft-rigging. This coupler is standard on a number of the prominent railroads and is reported to be giving entire satisfaction, as the gaskets are showing themselves to be of long life and they do not get lost.

THE BUFFALO BRAKE HEAD.

The accompanying illustration shows a new forged steel brake head which is manufactured exclusively by the Buffalo Brake Beam Company, Buffalo, N. Y. The head is made entirely of forged steel, with the parts arranged so as to clamp

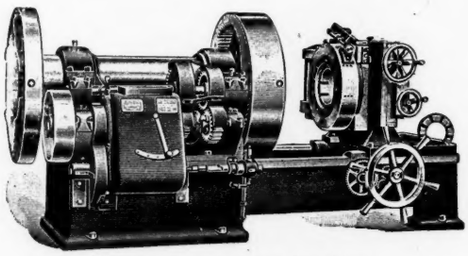


The Buffalo Brake Head.

the beam securely with a face or bearing plate, and it has a surface and thickness sufficient to act as emergency brake shoe. The head which has received the most favorable comment from the mechanical men, can be seen at the Buffalo Brake Beam Company's exhibit.

STOEVER POWER PIPE MACHINE.

The accompanying illustration shows the heavy power machines for cutting off and threading pipe which are built by the Stoever Foundry & Manufacturing Company, Lebanon, Pa. This type of machine is made in four sizes of capacity up to 6, 8, 10 and 12-inch pipes, respectively. They are very powerfully geared and substantially designed. The headstock is cast in one piece, so that the bearings are held rigidly in line. The gearing is all on the outside of the machine, where it can be readily inspected. The gear box is oil tight, so that the gears are running in oil continuously. A single pulley drive is used, with a suitable speed plate for the use



Stoever Power Pipe Machine.

of the operator in securing the proper speeds. The internal driving gear is unique on a pipe machine.

The two gripping chucks are powerful, and the rear chuck is equipped with flange grips for making up flanges, and, through their use, flanges can be made up on both ends of the pipe. The die head is of the sliding type, and equipped with the companies well-known inserted cams and hardened plates.

There has been some demand for a two-piece coupler for steam hose, and the Gold Car Heating & Lighting Company is now prepared to furnish any of these couplers made in this way.